

COMPUTERWORLD

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The magazine for students preparing for computer careers

Campus edition

**Making mOnEy as
a “teChnoartist”**

**High-tech CEOs
pick hot job areas**

Exclusive Salary survey

**Fantasy writer
Piers Anthony on
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A minorities status report



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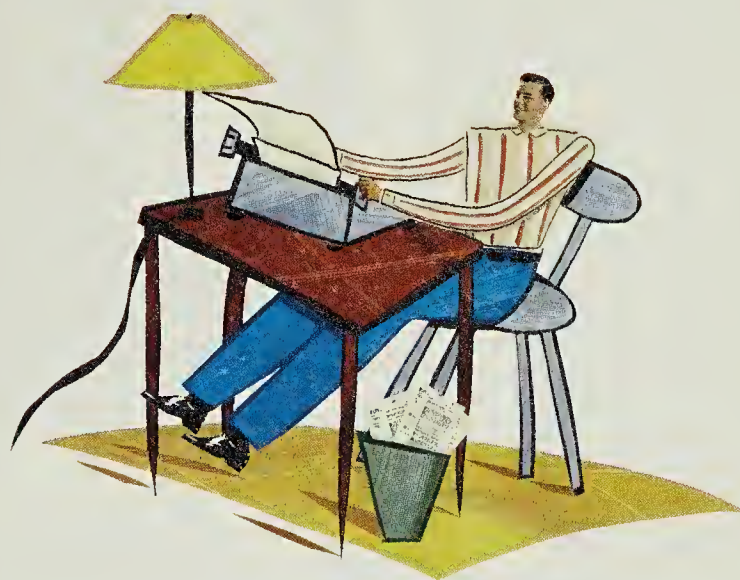
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Change at IBM

Even in the two years I've been here, it's become a different place to work. People are asking questions 'Why don't we try it this way?' and 'Why don't we do something different?'. Engineers have more autonomy; decisions are being pushed down. We're also offering our services and specialized knowledge in engineering, systems support and manufacturing to other companies, which is something IBM traditionally never did.

Gil is going places.

Flexibility and Opportunity

Through co-oping, summer and full-time work, I've been at about six or seven different large companies. As far as variety of assignments, IBM is the best. Most companies say this is what we want you to do, and we'll let you know when it's time to move on. One of the things I love about IBM is that my career direction rests with me.



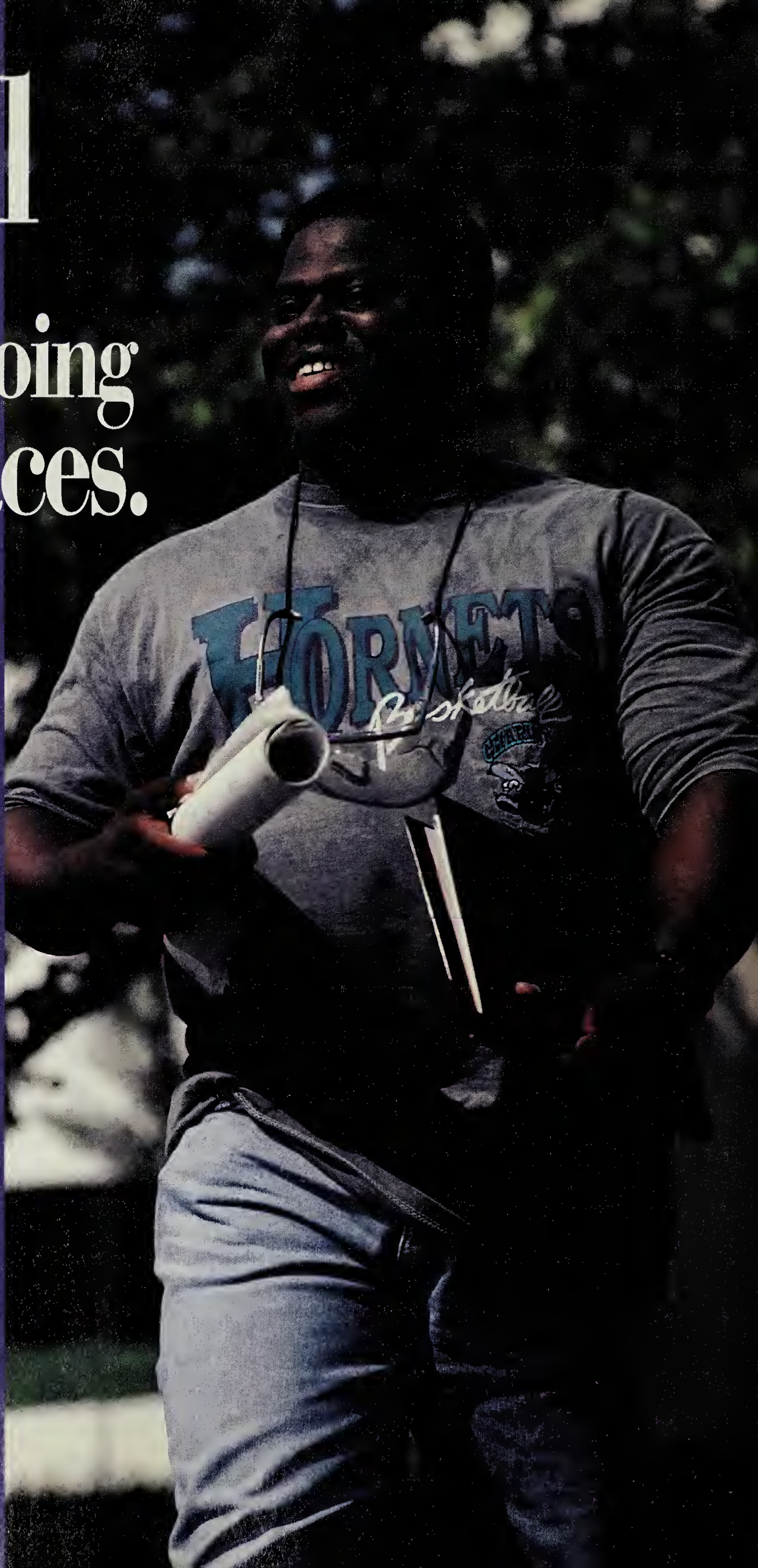
Gil Kibler received his Bachelor's degree in Industrial Engineering from Lamar University in Beaumont, Texas and his Master's degree in Manufacturing Systems Engineering from the University of Wisconsin. He works for IBM Technology Products.

Responsibility

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Steven J. Condon

DESIGNER

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PRODUCTION CONSULTANT

Joyce Chutchian-Ferranti

CHIEF COPY EDITOR

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ASSISTANT CHIEF COPY EDITOR

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RESEARCHER

Stefanie McCann

WRITERS

Piers Anthony

David Baum

Amy Bermar

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Alice Bredin

Michael Cohn

Leslie Goff

Julie Hart

David A. Kelly

Julia King

Joe Panepinto

Kathleen Rotenberg

Derek Slater

Candee Wilde

PRODUCTION DIRECTOR

Christopher P. Cuoco

EDITOR IN CHIEF

Bill Laberis

FEATURES EDITOR

Joanne Kelleher

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COVER ILLUSTRATION

Erik Adigard

EDITOR'S NOTE

rise and shine



Greg Mabry

I recently read a book called *Generation X* by Douglas Coupland (St. Martin's Press). In it, the author presents a tale about the twenty-something generation, a group of young adults drifting from place to place and from job to job looking for meaning and permanence. The book has just the right kind of hip, film noir feel to it that fills you with unease for the future of the protagonists.

And when I sit down and read the unemployment numbers in the newspapers, I have to think, yeah, things aren't as bright and chipper in the job market now as they were in the '50s. No wonder Beavis and Butt-Head are the Ozzie and Harriet of the '90s.

Then I pick up this sixth annual *Computerworld* campus issue and I realize that the fate of Generation X hasn't been sealed. Not even close. Computer science graduates across the U.S. are accomplishing great things and carving out their own futures.

Take Paul Friedman, who has a patent under his belt. Or S. Evette Carpenter, who made temporary work a permanent job by becoming a contract programmer. Or Bruce Barkelew, who went out and started his own company. Or Priscilla Brown, who fought the odds to become the only black woman working in the systems department at her company.

These technical people are making their mark with talent and sheer will. And no doubt there are many more of you out there ready to burst onto the computer industry stage and shine. In this fast-paced and changeable industry, there's plenty of room for success. The trick may be to write your own script, rather than to follow someone else's.

Lory Zottola Dix

Lory Zottola Dix, Editor

Reaching hire

Fantasy writer Piers Anthony

says success will come to those

whose high-tech work improves

everyday life

b y p i e r s a n t h o n y

Back in the Stone Age, when my wife went to work so I could foolishly try to be a free-lance writer, she was a computer programmer. That was in the 1960s, when mainframes had 16K bytes of memory and filled the room and had to be programmed from scratch. DOS did not exist then, and neither did the PC. But the seed had been planted.

When we had children, pets and computers came into our lives because children understand both. Their brains come with modular read-only memory cartridges, so they have preprogrammed insights that we adults, whose minds are primitive, have to struggle to achieve.

But the surprising fact is that about half the world's population remains antiquated, having had the misfortune to have been born before the

age of computers. These sad folks are wary of such newfangled instruments and resist computerizing, despite its evident benefits. I know because I'm one of those fogies who was dragged more or less kicking and screaming into the Computer Age. I was satisfied to write my manuscripts in pencil and type them on my manual machine; I didn't need any confusing electronics to mess with my text. Then they stopped making good manual typewriters.

So I explored the matter of computers. "Exactly what does a computer do?" I asked my wife, who was supposed to know. "Anything you want it to," she replied. That sounded promising, but I remained skeptical. "Will it wash the dishes? Will it mow the lawn?" "Don't be ridiculous!" she snapped.

For some reason, I didn't find that answer completely helpful. But it illustrates my point: The average ignorant Joe doesn't know beans about computers, and if he gets up the courage to ask



Piers Anthony photographed by Douglas Johns

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someone who speaks computerese, he's likely to get an indecipherable, hostile or even faintly obscene response. I/O, modem, spreadsheet — those terms sound like an IOU, hinting at a debt to a forbidding woman standing at the door of a house of ill repute, wherein are open beds with — well, never mind.

Yet I came, in time, to love the computer. I do word processing on a 486 system, and everything is exactly the way I like it: my Dvorak keyboard, every function where I want it (it does help to have a spouse who can program), yellow print on a brown background with black underlining, multiple files in multiple windows so I can instantly check my ongoing table of contents, a list of characters, research notes or yesterday's text.

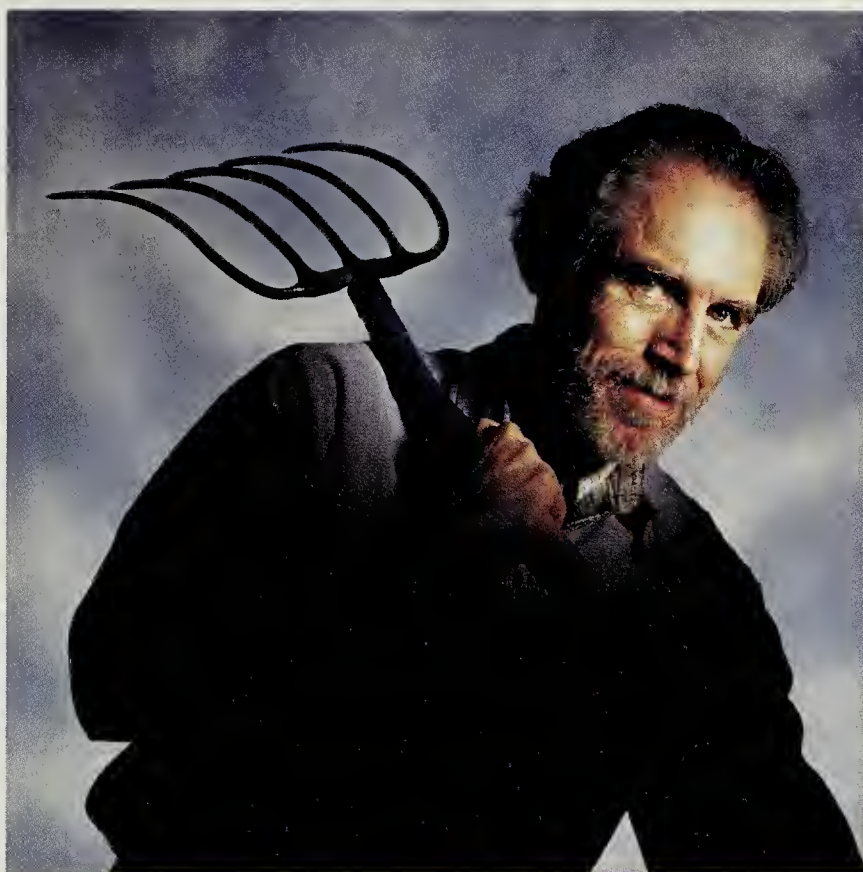
When the system comes on, it's like a genie animating the screen, eager to do my bidding. I'm connected. If I want to make a change to something I wrote last week, it's easy, with no erasing or retyping. Copy and Paste are beautiful. When I make a typo, *beep!* — the speller helps me fix it. It's like a girl-hating boy discovering romance; it's an awesome enlightenment, and life will never be the same.

But what about Joe or Jane out there who has a lawn to mow or dishes to wash or laundry to do? What does the computer offer them?

Let's face it: The markets for conventional computer applications such as word processing, accounting, calculation, information storage or games are limited. There are new variations on each all the time, but these must compete with competent existing programs. The era of exponential expansion is over. The big computer companies are downsizing. How does anybody who comes new to the scene make it, regardless of his competence? The prospects are bleak.

Unless . . . the future of computing is likely to be with the machines that are able to address the needs of those folk

who have been ignored before. What about designing a system that will mow the lawn? A robot lawn mower, not in the sense of a metal man pushing a sputtering machine but a device that can do for a lawn what a word processor does for a term paper. Something that's easy to understand and operate. There are surely several million sweating Joes out there who would like that device if it existed. But that design will require ev-



Douglas Johns

'Average Joe computing' is where the money is.

everything from hardware to software. Who is going to do all that? Whoever does do it will have a secure future.

So will the person who is able to write a manual for it that is intelligible and interesting. Currently, there's a huge commonsense writing void, and it has to be filled, probably by people who may not be geniuses at innovation but who are able to write in plain English or even tell stories, if that's what it takes to make a point. Logic is great for programming but not for real life. For life, things have to make common sense. Computers are objective; people are subjective. Who is going to introduce them to each other?

It is no longer good enough to make the customer struggle to master mind-boggling complexities of obscure programming. Joe isn't going to bother. Tomorrow's successes will belong to those people who know computers and who see the untouched needs of real people and figure out how to put the two together. Those who are able to bring the computer not halfway to the average man but almost all the way. Who have the

sense and competence to address the waiting market. To make systems that will enable the handicapped to function almost as well as others. To help the deaf to hear, the blind to see, the lame to walk. To drive cars to town and back. To repair roofs. To do anything Joe wants without hassle.

And, of course, to entertain and educate. Virtual reality is opening up a new dimension to visual experience. The same can be done for hearing and touch. Who will be the first to program a swim through shark-infested waters with the feel of the water against the skin, including, on occasion, the pain of the shark's teeth?

But all this will require an army of savvy technicians to make it happen. Folks who know or can figure out how to interface the esoteric electronics with the garden-variety world. Who aren't limited to the way things

have been in the past. The folks who are coming onto the computer scene right now and are looking for things to do. The folks who are ready to make computers mow the lawn. ■

Best-selling author Piers Anthony was born in Oxford, England, in 1934. He has published 96 books, including Kilobyte, Virtual Mode and Fractal Mode (Ace/Putnam). Twenty-one of his paperbacks, including the Xanth series fantasy fiction, have been on The New York Times best-seller list. He lives with his wife, Carol, on a tree farm in Florida and is an ardent environmentalist.

The convergence of TV and computers . . .

Consumer and computer technology is coming together to produce a "communicopia" of interactive TV and multimedia applications. This merger is also creating a demand for the "technoartist" — a person with the development and artistic skills to bring these applications alive.

by david baum

how it works

It has pretty much been that machines have known their places. You go to your computer to power up a word processing program, do a little spreadsheet work, stuff like that. For entertainment, you turn on the TV, maybe watch a little *Letterman* or, if you're in a particularly twisted mood, some *Ren and Stimpy*.

Faster than you can say "*Star Trek* reruns," however, things are changing. There's a shift occurring that is blurring the lines between computer and consumer technologies. The same TV on which you can watch the hottest video will let you order pizza or will deliver a newspaper to you on-line.

Best of all, this convergence of technologies — computers, TVs, cable and telephone — is creating job opportunities for computer science graduates like nothing you've seen in a long time (see story at right).

Brave new world

The killer apps in this brave new world are known collectively as "interactive multimedia," computer-based applications that combine text, graphics, video, audio and animation into a media experience for users.

Interactive computer technology will give formerly passive TV view-

ers almost total control over what they see as well as find its way into mainstream commercial and business applications.

Today's retail giants, for instance, are eyeing the approximately \$70 billion that U.S. consumers spend on catalog shopping each year. What if that service could be made even easier? Toys R Us, Inc., for example, is currently creating a private TV network and experimenting with video-compression technology to sell products via an on-line, on-demand shopping network.

Meanwhile, the New Jersey Department of Education is creating an interactive TV system in which students use remote controls to respond to a lesson and results are automatically tabulated for the instructor's immediate review.

Health care companies, such as Blue Cross/Blue Shield of Massachusetts, are investigating the concept of "desktop docs," a kind of house call with a high-tech twist. Interactive TV would enable patients to contact their practitioners through video and get medical advice on the fly, says Martin V. Joyce, executive vice president, client services group, at the Boston-based company.

For its part, the entertainment industry will take on elements of computing that until now have only been available in a rudimentary fashion on a desktop machine.

While watching a nature show,
How it works, page 10

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what it means

The convergence of consumer and computer technology means greater opportunity for computer professionals.

This burgeoning area will need a slew of software developers, hardware designers, systems analysts, network administrators, digital audiovisual specialists, database administrators, communications gurus and other professionals to build the infrastructure that brings multimedia productions to market.

Creative people are needed to put together the interactive products and services people will use.

Currently, there are as many as 100,000 people working full-time in the multimedia field, says Doug Millison, editor of *Morph's Outpost on the Digital Frontier*, a new magazine for multimedia professionals.

Certain industries have rushed headlong into hiring multimedia specialists. Time Warner, Inc., Walt Disney Co. and Paramount Communications, Inc. are "gearing up for the information highway in a big way" as they prepare for a populace that will quickly demand new forms of entertainment, says Marc Canter, head of San Francisco-based Canter Technology, which is working on interactive TV and multimedia applications.

"All the word processing ma-

chines and spreadsheet machines have been bought," Canter says. He points out that growth in the productivity software area, for one, is sluggish, consisting of upgrades by the same 5% of users. "If you want to go hit the other 95% of the world," Canter explains, "you better figure out how to integrate with entertainment markets, with intelligent devices and services of all types."

Rise of the technoartist

The challenge, in Canter's view, is not building the enabling technologies — wiring, new TVs, super-density CD drives — but producing the snazzy interactive productions people will tune in to once these capabilities are in place.

Canter, who is not only a businessman and software developer but also an opera singer and computer graphics creator, envisions the emergence of a "technoartist," the equivalent of a film auteur. This person will be able to combine the talents of a storyteller, musical director and software developer with the management experience to direct large multimedia projects.

Millison agrees: "It takes an individual with a broad understanding of both the technical and artistic sides to create entertaining multimedia productions." Such a person might have a design background or may have attended film school.

These skills will open doors to new types of work. For example, to help sell vacation homes, one Los

What it means, page 10

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how it works

FROM PAGE 8

for instance, a viewer could quickly bring up a map of the animal's habitat. And baseball fans could view stats on batters or request a replay of the home run they just missed while raiding the fridge.

Video-on-demand would enable viewers to use their remotes (think of them as "air mice") to scan through the menu of titles on the TV, searching and selecting movies not only by title but also by director, leading man or "romance quotient."

It's an ambitious vision of pick-as-you-go use. With the market expected to reach \$3.5 trillion worldwide by 2001, according to John Sculley, former Apple Computer, Inc. chairman, it's no

wonder some heavyweight companies in the computer (Apple, IBM), cable (Tele-Communications, Inc.) and entertainment industries (Time Warner, Inc., Paramount Communications, Inc.) are aggressively involved.

Bringing home the bacon

What will make this grand vision of interactive communications possible (see graphic page 11)? The following technical advances are vital:

- **The ability to translate all audio and video communications into digital format.** A variety of computer and electronics firms are hard at work in this area. The list includes Apple, IBM and Canter Technology, a San Francisco developer of interactive TV and multimedia applications. The work, which is reminiscent of assembly programming, may be the "easiest" part. The difficult part will be the effort to digitize existing information resources such as art archives. Canter Technology founder Marc Canter predicts it will take most of the next century.

- **The ability to transmit digital signals over high-bandwidth fiber-optic lines or via ultra-high-frequency wireless.** This new digital highway will, in the words of GTE Corp. Vice Chairman John Segall, "tie the world together in a hush of photons." Most every large telecommunications and cable company is working on it, including GTE in Stamford, Conn., BellSouth Corp. in Atlanta, Tele-Communications in Englewood, Colo., and Time Warner in New York.

- **New compression and storage methods.** Companies are working to create digital storage for complex multimedia objects on computers called video servers, from which they can be dished out on demand to TV users.

Right now, storing data digitally is a crushing demand. The 95 minutes of *Wayne's World* alone will require billions of bits of memory, quickly overflowing today's disk drives. Help may come in the form of CD-ROM enhancements, though.

Others envision a home cable box or chips built directly into TVs that will enable digital functionality for interactive TV via fiber-optic wire or satellite transmission. ■

what it means

FROM PAGE 9

Angeles real estate company hired an ad agency whose technical people had to devise a multimedia kiosk application to enable users to "walk" the grounds of new developments, view homes from various angles and even browse from room to room.

"Personality tests used to classify programmers as rigid, meticulous, follow-the-directions people," says Billy Brackenridge, a programmer and engineer at Echo Speech Corp. in Carpinteria, Calif., who designs chips and algorithms for sound cards used in Macintoshes. "That is no longer the case. The new breed of programmers are not just techies, but liberal artists."

Show your stuff

At Echo Speech, for example, an understanding of music is essential to the creative process. In fact, the job requirements for one recent programming position included being able to play a musical instrument.

"There will always be a need for hardware designers and software engineers," Millison says. "But these careers will begin to blend with the creative disciplines as technology changes and evolves."

The topics in Millison's publication reflect this blending of the practical and creative. The articles in the premier issue include "Building multimedia databases" and "Designing instructional ISDN" along with "Making money as a title brewer."

One technology evolution to watch is in old software languages, which are changing to handle the requirements of this new field. The foundations of multimedia development can be found in the new authoring systems, which help designers structure interactive multimedia experiences along a time line or through icons.

Authoring tools are generally based on object-oriented scripting languages, such as Script X from Kaleida, a joint venture between IBM and Apple.

Another Apple authoring tool, Apple

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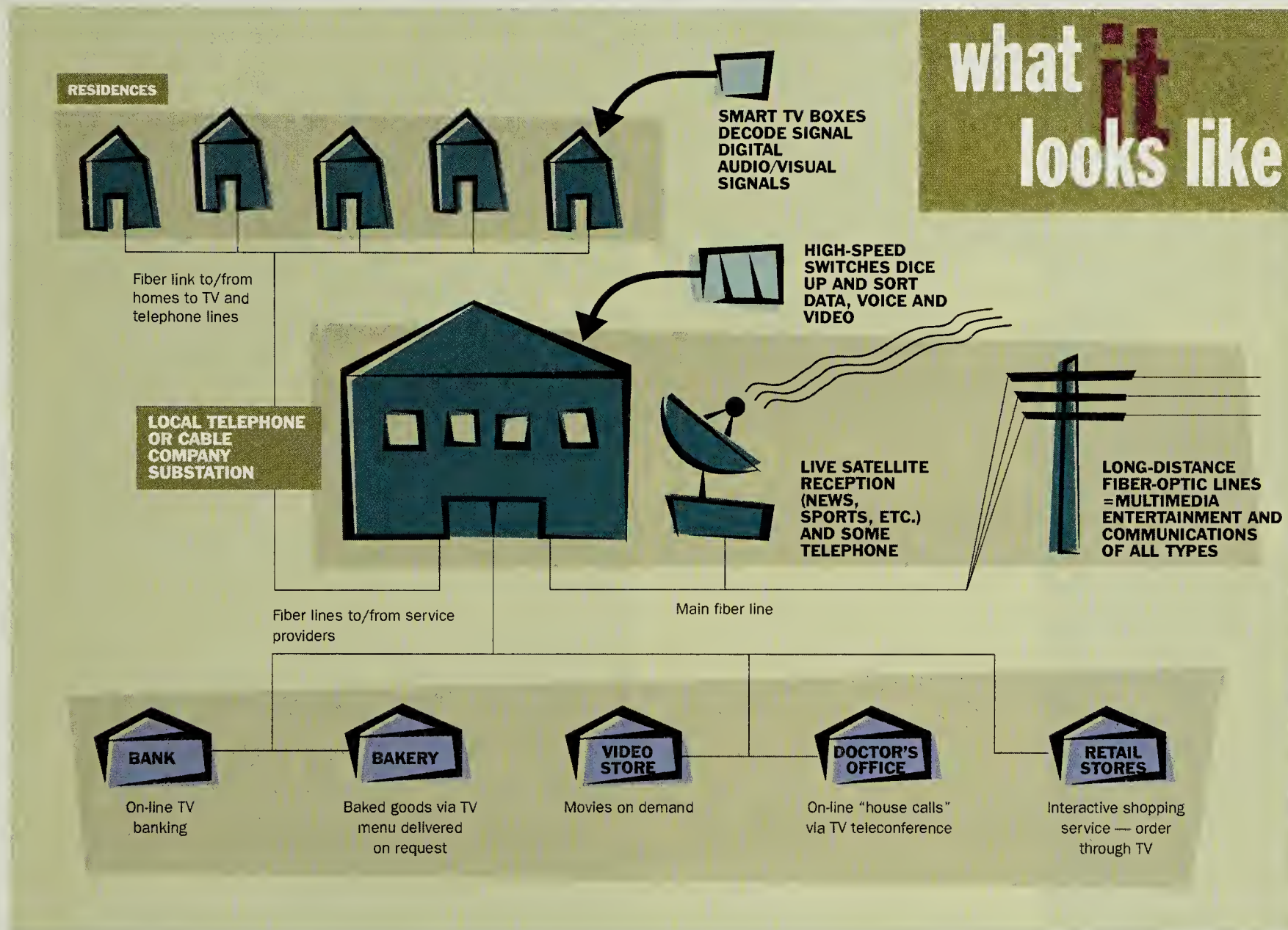
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what it looks like



Personal Intelligent Electronics (PIE), includes both a media kit for nontechnical people and a programming environment for software developers. A nontechnical creative director at an ad agency, for instance, could use the media kit to create a rough prototype of an application. Apple PIE would then generate the scripting code, which in turn would be tailored by a skilled software developer to create a slick-running program. Other tools of this type are popping up for Windows and Unix.

"If you want to get in at the core of this, you'd best be learning C and moving quickly on to C++," Canter advises. "The glue that binds it all together is object-oriented technology, with its ability to treat abstract entities like real-world objects."

Not your father's Cobol shop

Multimedia professionals will also have a much more interesting array of interface technologies to work with: voice recognition, holographic interac-

tion with three-dimensional characters and virtual reality interfaces.

"The switch from static, character-cell screens to graphical, event-driven environments is just a shadow of what user interface programming will soon entail," Millison predicts. Every screen will be a window into a massive network. Computers will respond to spoken, scribbled, pointed at and typed commands. Users may use a mouse or may prefer their remote controls.

This means application developers will have to master new kinds of interfacing techniques, where an "event" might just as easily be triggered by pointing to a sensitive area in a 3-D holograph as it is today by moving the mouse to a sensitive area of the screen.

In the communications area, skills in telecom, infrared technology and fiber optics will be important. As companies race to put the emerging high-bandwidth infrastructure to work, "there will be a welcome reception for network administrators who can apply

these new sciences to the complexities of wide-area and internetwork connectivity," Millison predicts.

The basics still count

But all this glitz and glamour doesn't mean that core skills don't cut it. Understanding how a computer is put together, what makes a good software program and how to configure a network optimally are still vital.

"Those things aren't going to go away no matter how well-insulated we become from them through modern languages, graphical user interfaces and all the other squishy-feely stuff," Brackenridge says.

He pauses, searching for an example. "Sure, we hired a musician to fill a position, and part of his job description is to play video games. But he also happens to be an acoustical engineer and have a degree in physics." ■

David Baum is a free-lance writer in Santa Barbara, Calif.

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Where would you send someone to grad school?

by julie hart

Joe Guglielmi

Chairman and chief executive officer
Taligent
Developing operating systems using
object-oriented technology

"We deal with colleges such as Stanford, Carnegie Mellon, Brown, MIT and the University of Michigan. These are leading schools that have great curricula in computer science at the undergraduate and graduate levels.

If a student wants to specialize in technology and push the computer science envelope, having an advanced degree that focuses on client/server, distributed objects or object design will be very important. This is where the breakthroughs will come from.

Students shouldn't be spending too much more time on Cobol. They should be learning C and C++ languages."



ON THE SPOT

Max Hopper

Chairman
AMR Corp.'s Sabre Technology Group

"If a student is looking at studying information systems to work in a managerial or marketing role, schools such as the University of Texas or UCLA come to mind. These schools seem to approach computers from a business view.

If a student is heading toward engineering, I think of UCal, Berkeley or maybe Carnegie Mellon. MIT, on the other hand, offers a good mix that gives students a chance to get in-depth on both the business and technology side of IS.

No matter which focus they choose, business or engineering, students should take courses that are on the cusp of being mainstream, such as object-oriented [programming] and multimedia.

I was telling somebody the other day that I wish I could start over. When I was getting started, we had such primitive tools compared to what's available now. And the cost was so out of whack. Today, you can do so much more. I would be very pleased if I had a son or a daughter ready to go into graduate school in computer science."



ON THE SPOT

Alan Kay

Apple Computer, Inc. fellow and inventor of the SmallTalk object-oriented programming language

"I don't believe in getting a degree in computer science at the undergraduate level. I have my undergraduate degrees in mathematics and molecular biology with minors in English and anthropology. I wouldn't have been one of the inventors of object-oriented programming if I hadn't known about cell physiology. Every great idea that's happened in the last 30 years in computer science research has been an adaptation of other knowledge.

The purpose of an undergraduate education is to get a large-scale view of the world. If you only know about one thing deeply, then you tend to see the world in terms of that one thing.

The metaphors and analogies you derive from this one thing tend to be weak.

One of the best places, historically, for mixing all kinds of undergraduate experiences is a college like Brown. Other institutions that have good general educational programs are places like Berkeley, Carnegie Mellon and MIT. What you don't want to do is go to a school that tries to churn out one kind of graduate."



ON THE SPOT

Fran Tarkenton

Former Minnesota Vikings quarterback and Hall of Famer. Now CEO at Knowledgeware, Inc., vendor of computer-aided software engineering products

"Now is one of the best times to be in the workplace. We're [experiencing] the biggest paradigm shift in my 30 years of business. We spent the '50s, '60s, '70s and '80s building infrastructure and layers, and we didn't have a lot of accountability.

We were the leading economic power in the world. We didn't have a threat from the European common market and Japan. We started to wonder about ourselves: Can we compete?

For some time, we questioned and doubted ourselves. [Through this process], however, America

became invigorated. At corporations, everyone is asking the question: 'What are you doing that's adding value to this company?'

This is good news for young people entering the workforce. The opportunity to play a role in re-engineering our businesses, our processes and our applications is great. I say, 'Get out of the stands and get out into the arena where you can make a difference in the world.' America is waiting."



ON THE SPOT

Julie Hart is a free-lance writer in San Jose, Calif.

THE FACTS OF (grad school) LIFE

MIT

Graduate computer science degree
Cambridge, Mass.

Enrollment: 213
Women: 39
Men: 174
Minority: 10
Tuition and room and board: \$21,250

University of Texas

Austin, Texas

Enrollment: 221
Women: 30
Men: 191
Minority: 19
Tuition: Resident: \$2,051; out of state: \$5,171. Room and board: \$3,408

Carnegie Mellon University

Graduate software engineering degree
Pittsburgh

Enrollment: 22
Women: 2
Men: 20
Minority: 1
Tuition: \$17,500

University of Michigan

Graduate computer science and engineering degree
Ann Arbor, Mich.

Enrollment: 54
Women: 6
Men: 48
Minority: 6
Tuition: Resident: \$5,553; out of state: \$8,583. Room and board: \$2,327-\$5,923

Brown University

Providence, R.I.

Enrollment: 100
Women: 15
Men: 85
Minority: 9
Tuition and room and board: \$24,292

Stanford University

School of engineering
Stanford, Calif.

Enrollment: 156
Women: 76
Men: 80
Minority: 12
Tuition and room and board: \$25,035

UCLA

Graduate engineering degree
Los Angeles

Enrollment: 740 (domestic only)
Women: 130
Men: 610
Minority: 299
Tuition and room and board: Resident: \$5,650; out of state: \$11,156

University of California at Berkeley

Graduate school of engineering
Berkeley, Calif.

Enrollment: 1,011
Women: 130
Men: 881
Minority: 40
Tuition and room and board: Resident: \$3,457; out of state: \$11,156

UP & COMERS

kelly garrels

Degree: Bachelor's degree in MIS, University of Central Florida, Orlando, Fla., December 1992. Current title/company: Implementation analyst associate, The Walt Disney Co., Orlando, Fla.

Before interviewing at The Walt Disney Co. last spring, Kelly Garrels had been looking for an information technology job in the health care field following a college job at a pediatric home health care agency. But the pickings were slim.

Garrels was disappointed that the only jobs available to her were clerical in nature. "I felt I deserved more coming into the field with a four-year degree," she says.

Disney apparently did, too, hiring her into a position that is on the management track. While Garrels' story has the happy ending of a Disney film, getting there had its bumps, including five months of postgraduate interviews with a variety of companies.

At Disney, the interviewing was "very intense," she says, consisting of three on-site meetings with managers and staffers with whom she would be working.

"Managers wanted to know if I could learn quickly and if I thought I could handle the job." In the end, she says, it boiled down to a good fit between her personality and the Disney corporate culture.



Today Garrels helps control and maintain back office applications for corporate accounting and inventory users.

"When you work for Disney, you're in a serious working environment, but you're working toward animation and making kids and families happy. You're making Mickey Mouse a reality," she says. —Leslie Goff

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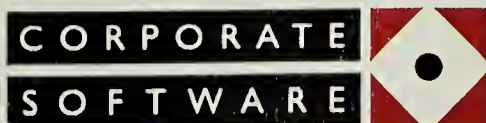


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Job security is a thing of the past. That's
why some grads are making their own
opportunities.

Just do it

by david a. kelly

you've just spent God knows what on a solid computer science education only to find out that the job market is tighter than one of Cindy Crawford's outfits. But there is just no way you'll settle for a McJob — a low-paying, low-prestige job. No way. You'd rather be tortured — like watching every *Dynasty* episode ever made until you've memorized all of the dialogue.

Just because times have definitely changed and there are fewer jobs around to keep you rich, fat and happy until gold watch time, that doesn't mean you have to settle. Take things into your own hands and go it alone, either as a contract programmer/consultant or by starting your own business.

"Being employed by one company for 30 years is just not going to

happen," says Alan R. Simon, author of *The Computer Professional's Survival Guide* (McGraw-Hill, 1992). "Recession, massive layoffs, changing technology and other factors have radically altered the employment picture for computer professionals," Simon adds.

In fact, information systems pros can expect to change jobs an average of eight to 10 times in their careers, says Henry Conn, a management consultant at A. T. Kearney, Inc. in Chicago. Eighty-five percent

of the work force will go through an involuntary job change by the end of the century, adds Richard Deems, president of Deems Associates, Inc. in Ankeny, Iowa.

For all the growth pains the computer field is going through, however, "It is one of

the few areas in which people can retrain themselves or start their own company for relatively low cost," Simon says.

Creating a business or contracting out your services doesn't necessarily require lots of equipment or

start-up capital. "You can buy a few PCs and the proper software and learn new technologies as needed. People with drive and incentive can retrain themselves for the way the market is going," he says.

S. Evette Carpenter, for instance, opted out of full-time work as a programmer and has held four different contractor jobs in the past two years. Bruce Barkelew parlayed his shareware communications program into a \$25 million business. And Bob Parsons started his \$40 million company tinkering with his personal finance software in his basement.

Carpenter, Barkelew and Parsons are examples of what's possible if you're self-motivated:

Each of S. Evette Carpenter's jobs

S. Evette Carpenter Contract programmer

in the past two years has been a short-term contract job, and each one has given her a wealth of skills that a single full-time, permanent job never could have provided.

Carpenter, a Boston University computer science graduate who spent five years as a full-time pro-

starting Your own
company means
Pulling long hours;
80-hour weeks are
commonplace



Michael McLaughlin

grammer, found a contracting job while looking for a full-time position. She hadn't considered contracting but was offered a contract job that gave her the opportunity to learn the C++ language.

Being able to learn while you work is a key selling point of contracting. "I've found that in contracting, you can trade off being able to do more advanced jobs in order to be exposed to skills that you wouldn't get otherwise," Carpenter says.

It also doesn't hurt that contract programmers get paid as much as 30% more than people in comparable permanent positions, accord-

ing to Susan Perut, vice president at American Contract Services, Inc. in Cambridge, Mass.

Carpenter notes that to succeed as a software contractor you have to be adaptable. "You have to be able to start off running," she says. "Every day is like the first day at a new job."

You also need to have good social and communication skills. "You are going into situations where you don't know anyone," Carpenter says. "You need to make your bosses feel comfortable, and you have to be able to communicate effectively with them to accomplish the job they hired you to do."

Bruce Barkedew President Datastorm Technologies, Inc.

Bruce Barkedew didn't expect to become president of software company Datastorm Technologies, Inc., a \$25 million firm and one of *Inc.*'s 500 fastest-growing companies, when he grew up. Although he got a computer science degree from the University of Missouri, he thought he was going to become a musician, having played guitar professionally since age 14.

But software development got in the way of his becoming the next Jimi Hendrix. In 1984, while still an undergraduate computer science

student at the University of Missouri in Columbia, Barkew was frustrated by the inadequate software available for dialing into the university computers. So he started to build his own while in school, dubbing the software Procomm.

He continued to tweak the program after he graduated, working as a programmer in San Francisco. In 1985, he

**IS professionals
change jobs an
average of eight
to 10 times in
their careers**

released Procomm as shareware.

Within one year of its release over bulletin board systems across the U.S., the package brought in more than \$2 million in registration fees alone.

Barkew, 39, attributes a lot of his success to his broad-based education. Figuring he would probably be self-employed so he could spend time on his music, he prepared himself for a non-traditional career.

"Because I always planned on being self-employed, I took extra business and computer science courses," he says.

While the response to Procomm was immediate and strong, it took a leap of faith



Robert Mercer

Bruce Barkew: "I got used to the idea of risk and uncertain futures when I was playing in bands."

for Barkew to quit his full-time job to concentrate on Procomm.

Barkew says his willingness to take risks has helped him invent his own career. "I got used to the idea of risk and uncertain futures when I was playing in bands. You have to create your own path."

Bob Parsons President Parsons Technology

All Bob Parsons needed to start his company — Parsons Technology — was solid computer science skills, a tough hide and a spacious basement.

Parsons created the MoneyCounts personal finance package in 1984 in his home; today, his company is worth \$40 million and has 300 employees and 1.2 million customers.

Parsons says one of the reasons he succeeded was that he wasn't afraid of failing. "When you [take a risk], you are going to fail a few times," Parsons says. "But hang in there; sooner or later, it will work."

Indeed, the first three years that Parsons Technology was in business, it came close to failure, burning up

nearly \$50,000 of Parsons' savings and borrowed money. Sales took off only after Parsons took another chance — lowering the software's price to \$12.

**Contractors earn
an average of 30%
more than
permanent
employees with
equivalent jobs
However, they
don't get benefits.**

Parsons acknowledges that if you start your own company, you toss aside any security blankets you might have had working for someone else.

But nothing is more freeing than having control over your own future. "Find something you love, dedicate yourself to it, and hang tough," he says. ■

David Kelly is a free-lance writer in West Newton, Mass.

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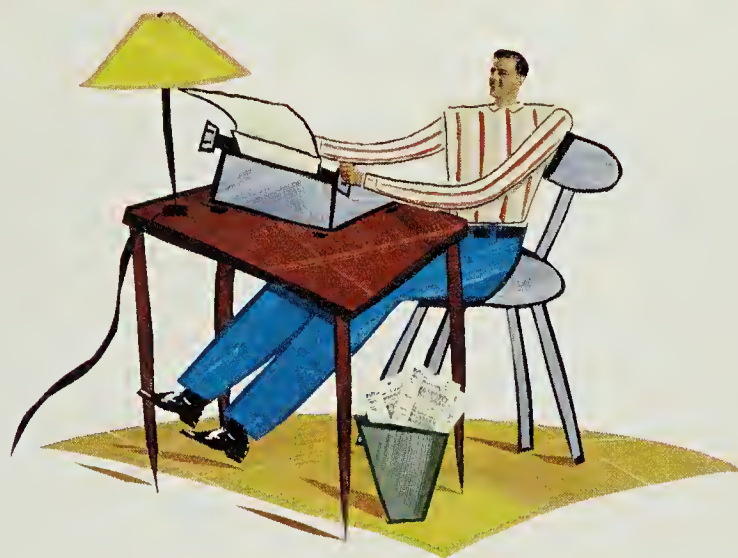
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Resume madness

Enough with all the gloom and doom!

Enough about slowdowns and layoffs and jobs jumping overseas. You want a high-paying, high-tech job? I say you can get one.



by michael cohn

Anyone can get a job in information systems. I mean it. I've had four in the last 10 months, but I'd rather not talk about that. Instead, I'd rather talk about how you can get a great job, a challenging job, a big bucks, fast-lane, leaping-up-the-ladder job even in today's struggling computer market.

You can do it. But it takes more than a \$40 tie or an uncle in accounting. It takes the perfect resume. Not the wimpy-soft resume of the '70s but the slap-on-your-sweats, give-me-20 resume that puts products on the market and profits in the bank for high-tech companies today.

Pay attention: This is your ticket to the big time. Below are the typical areas of a resume and my priceless secrets for dealing with them.

These tips will help crush the competition, get you in the door and put you behind a desk making 50 big ones, plus bonus.

The name.

Use the name to your advantage. Spice it up a little bit. Steve Smith goes nowhere fast. But Sir Stephen Smith — now that might turn a few heads. Or try "Sister" Marion Jones. Sounds kind of respectable, doesn't it?

Nicknames also help. Mark "Keyboards" O'Malley is good. Mark "Keg-sucker" O'Malley is bad.

The address.

Forget your real address. Make a statement instead! Saying you're from the Bronx suggests you're tough as nails. Anyplace in Japan implies you believe in an 18-hour-a-day work ethic.

Just rent a post office box and forward your mail. But choose your "new" address carefully. While Cupertino, Calif., might appeal to a leading-edge firm, a mainframe manufacturer might prefer something less radical ... like the town of Bedrock.

The phone number.

Skip it. What are the odds they'll call — 1,000 to 1? If they do, they'll probably just catch your roommate somewhere

in the middle of his second six-pack.

My advice is never put your phone number on a resume, unless you want to try some interesting 900 number, which might wake up a recruiter or two.

The ambition statement.

Forget the ambition statement. You know what I mean: "Seeking a challenging IS position using state-of-the-art technology in a high-growth, future-oriented corporation that is doing neat things for the environment."

A better idea is to tell them what you're NOT seeking. "Not seeking a job where I'm paying my dues for eight years, maintaining ancient Cobol code that crashes every other night, slaving





for some horrible boss and groveling in the smallest cubicle in the world until I finally claw my way into a lower management position, only to have the company lay off 40% of its work force so that I wind up in some noncritical, low-paying, dead-end, back-office position."

Education.

Don't be afraid of Yalies and Ph.D.s. Be proud of where you go to school and play it straight.

But just to be on the safe side, send an application to some prestigious high-tech program at a prestigious school.

Until they respond, you're not lying if you list under your education credits: "B.A. in Watersports Administration, Massatucky State, 1993... and current doctoral candidate, Nuclear Computer

Simulation Modeling Fellowship Program, MIT."

Experience.

Even fresh out of school, you've got to have experience. But don't mention that you've invested in your own relational database or coded an object-oriented commodity trading system. . . . Everybody's done that stuff.

I'm talking about hands-on experience: high-level management, microchip design, hostile takeovers, etc. So if you're a little light in the experience area, don't tell lies. Instead, simply try a bit-more-concise explanation of the experience you do have.

For example, if you worked as a cashier at Food Giant, make it, "Monitored and troubleshot retail point-of-sale bar-code inventory scanning system."

"Conducted usability testing for graphical user interface" sounds a lot better than "played too much Nintendo."

But don't try "Evaluated remote-accessed continuous-availability multimedia environment." Most employers can pick that one off as watching too much MTV.

The close.

"References furnished upon request"? What kind of power-close is that?

Let me leave you instead with this recommendation: Close with impact. Close with passion. Close with a line they'll remember, like "Please, please give me a job. And by the way, I know where you live." ■

Michael Cohn works at a very large computer company in Atlanta.

UP & COMERS

sukanya krishnamurthi

Degree: Bachelor's degree in computer engineering, Poona University, Poona, India, 1990; Master's in computer science, University of Texas at El Paso, December 1992. **Current title/company:** Information technology specialist, corporate administrative information systems, Hewlett-Packard Co., Palo Alto, Calif.

Sukanya Krishnamurthi thinks her concentration on and love for the technical side of computer science brought her to Hewlett-Packard, where she is an information technology specialist. Better still, she thinks her technical bent is the key to her future success and achieving her goal of becoming a software design engineer.

She may be on to something. With more and more people hearing the siren song of management, companies will need the

skills of pure technologists.

But Krishnamurthi's career was nearly scuttled before it even got started. As an Indian foreign national, she was barred from on-campus interviews. Many companies, leery of labor department certification rules, steered clear from considering her resume.

Thanks to technology, however, Krishnamurthi overcame that barrier. HP contacted her when a relational database application that searches for job candidates by keywords turned up Krishnamurthi's resume. HP was looking for experience with the HP 3000 and HP 9000, relational databases, SQL, Cobol and C.

She had interviewed elsewhere two days before, so "everything was fresh in my mind — my projects, my experience, my education. I had a concise presentation."



William McLeod

The offer came after a full day of interviews with business and IS unit managers and staffers. She sold herself with her experience as a teaching assistant in an HP computer lab at grad school.

Krishnamurthi now helps support HP's staffing system, which consists of a recruiting system, a reporting system and an internal job openings system. In the future, she hopes to work on a project integrating the three systems into one.

— Leslie Goff



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UP & COMERS

duane westbrook

Degree: Bachelor's degree in computer science, 1988, School of the Ozarks, Branson, Mo. **Current title/company:** Senior systems analyst, J. B. Hunt Transport, Lowell, Ark.

It's a wonder Duane Westbrook's head isn't spinning. With five promotions in five years, he's had a whirlwind romance with J. B. Hunt Transport.

Westbrook says part of his success in landing his job was because of experience he gained in college. One key to excelling is his motto that if you "make your supervisors look good, they'll look out for you."

Joining J. B. Hunt as a programmer in the summer of 1988, Westbrook came on

board during a flurry of activity. The company was converting from an IBM System/38 to an IBM 3090 and was expanding its information systems department from three to some 25 staffers.

What brought Westbrook to the attention of interviewers was the 20 hours a week he spent working for an on-campus outsourcing service, which provided payroll and other computer services for the Branson Public Schools and several national accounts.

Fiddling with his university's systems gained him experience in Cobol, CICS, VSAM and PC technologies. "PC experience is essential to getting your foot in the door," he says.



Matt Bradley

Nor does Westbrook downplay the time during college he spent bagging and stocking groceries. "My resume showed that I could work hard and still maintain a high GPA. That's very important to employers."

Today, Westbrook is involved in automating J. B. Hunt's trucking fleet and laying the infrastructure for LANs.—Leslie Goff

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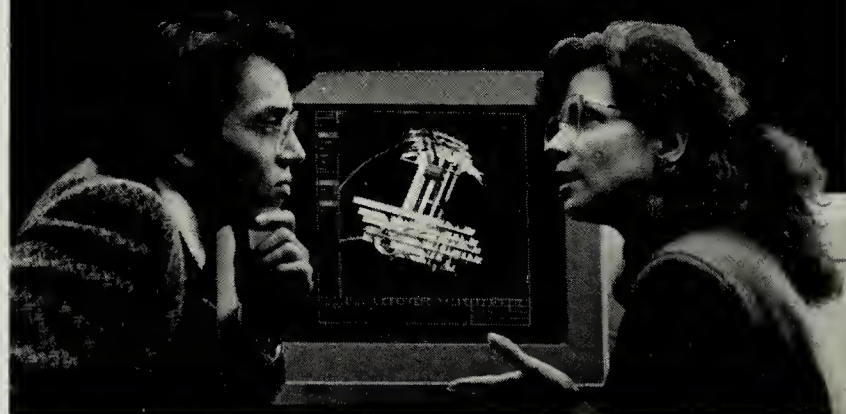
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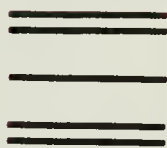
1	In order of preference, please list the six companies you'd most like to work for. Then, please indicate the <i>department</i> where you'd like to work in each company you mentioned. (For departments, use the code that matches the departments in the list at the far right.)	Company Name	Dept.
		1) _____	_____ A. MIS
		2) _____	_____ B. Engineering
		3) _____	_____ C. Sales/Marketing
		4) _____	_____ D. Technical Support
		5) _____	_____ E. R&D
		6) _____	_____ F. Other
2	If you could ask a recruiter one question about your career, what would it be?	_____	
3	Why did you choose to prepare for a computer career?	_____	
4	What undergraduate or graduate degree do you have or are you currently pursuing?	UNDERGRADUATE () have () pursuing () MIS () Computer Science () Computer Engineering () Electrical Engineering () Other _____	GRADUATE () have () pursuing () MIS () Computer Science () Computer Engineering () Electrical Engineering () Other _____
5	If you plan to attend graduate school in the next two years, what degree will you pursue?	() business	() technical () other
6	How did you receive this issue?	() picked it up in my school's placement office () other: _____	
7	If you were told about this special issue by one or more faculty/staff member(s), what are their titles?	1) _____ 2) _____	
8	How would you describe this special issue:	() Better than any other campus publication designed to help me with my career () Comparable to any other campus publication designed to help me with my career	
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TURNING AN INTERNSHIP Performance anxiety INTO A JOB TAKES DETERMINATION

by derek slater

the economy and job market are still wallowing in the pits, and more and more interns are pinning their hopes on landing a job at the same company after graduation.

Take hope. Businesses report a solid track record of converting information systems and computer science interns to permanent employees. For example, Northern Trust Bank Co. in Chicago hires anywhere from four to 10 systems interns each year, with about 95% of those students moving to full-time slots at the bank.

The reason for this high retention rate, recruiters say, is that most companies wouldn't bring an intern on board if they didn't think the person had potential as a full-time worker.

"Our program is pretty informal — we don't necessarily say we're going to fill a certain number of slots. I screen the applicants as though they are potential full-timers," says Dana Milner, information services recruiter at The Home Depot, Inc. in Atlanta.

The most critical element in latching on to full-time

work is summed up succinctly by former Northern Trust Bank intern David Kraft: "Hard work."

Kraft started as an intern the summer before his senior year at Northern Illinois University in Dekalb. Although he had experience only with Cobol and assembler, at the bank he started working with a generic job control language doing ad-hoc reporting. The company liked his work enough to offer him a permanent position as a programmer/analyst without additional interviews.

Use time wisely

Working hard does not mean scrambling to fill every lull with busywork for the sake of appearances. It *does* mean putting a lot of energy into tasks and putting book knowledge into practice.

"As a programmer, you have to use your problem-solving skills to do an assignment. [Supervisors] shouldn't have to hold your hand all the time," student Christine Dixon says.

Dixon knows about hard work; she holds both a co-op position and a separate internship at Home Depot while she works toward a

bachelor's degree in computer information systems at DeVry Institute of Technology. Her co-op duties involve programming and code maintenance tasks on an IBM mainframe.

On Fridays, Dixon works as an intern in a different department — unpaid — to gain more exposure to LANs.

Home Depot intern Christine Dixon



Recruiters like that dedication.

"It's taking the job seriously, asking questions and diving into the second level," says John Ganley, director of employment at EMC Corp. Based in Hopkinton, Mass.,

Northern Trust Bank intern John Kraft



EMC manufactures advanced storage devices for midrange and mainframe environments and has established co-op programs with Northeastern University in Boston and Worcester Polytechnic Institute in Worcester, Mass.



Ganley explains that his company depends on its hardware and software engineers' ability to develop cutting-edge technology. In essence, the co-op program is a tryout to see who has the right stuff.

"At the end of the co-op, we know whether we have an athlete who can go the distance or a sprinter. We want people who can go the distance," he says.

Besides working hard and thinking hard, communicating well is on every recruiter's most-wanted list for potential employees.

One reason is that clear communication with supervisors will help avoid confusion and mistakes in day-to-day work. "If you can explain your understanding of what they're asking you to do, they won't have to keep telling you over and over, and you won't go off and do it the wrong way," Dixon says.

Another aspect of communication is dealing with supervisors in an up-front way about future prospects. If you like what you're doing and you like the company, tell your supervisor. Be direct about the hope of staying at the company after graduation, former interns advise, but don't bowl them over with hyperaggressiveness.

What could stop an intern from landing a permanent job? Recruiters say there are two common obstacles. First, some students don't demonstrate the aptitude or effort necessary to understand their assignments.

Second, the company's goals and the intern's sometimes just don't match. Businesses want to see that interns have some vision beyond paying next month's bills. They want to know that the student's ambitions will make him a good partner with the company.

Likewise, the intern needs to be sure there's a match. Do you like the work environment? Can you grow and advance in your career at this firm?

"I think my internship worked out

"At the end of the co-op, we know whether we have an athlete who can go the distance or a sprinter."

**— John Ganley
Director of employment
EMC Corp.**

because I liked what I was doing and I liked the people. And I really wanted to work at a large company," Kraft says. ■

Derek Slater is an assistant editor and former intern at Computerworld.

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paul friedman

Degree: Bachelor's and master's degrees in computer science, MIT, May 1990. **Current title/company:** Technical lead, Office Automation Division, Oracle Corp., Redwood City, Calif.

Paul Friedman, who oversees technical issues for a forthcoming product called Oracle Office, pretty much had his pick of jobs when graduation rolled around. A lifelong affinity for computers turned into a resume that looked more like that of a seasoned pro than a recent college grad.

Friedman already had a patent under his belt for developing the first data compres-

sion in modems while working at Microcom, Inc. in Norwood, Mass., during high school and college.

Later, he worked at two Digital Equipment Corp. research laboratories—one in artificial intelligence and one in future programming languages—through a co-op master's degree program at MIT.

The key to his early success? The public school system in his hometown of Westwood, Mass.

"I was computer-literate by the fourth grade. When the TRS-80 and the original Apple came out, Westwood had them."

After dozens of campus interviews and on-site meetings at various big companies,

Friedman says, he settled on Oracle because "people were having fun. Back East everyone was in a suit and tie."

Although Friedman is laid back, he concedes that his attitude doesn't work everywhere, despite his strong resume. "Digital said I was too casual, too arrogant."

—Leslie Goff



William McLeod

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Preferences, preferences

by alice bredin



IBM has a straight-arrow image, but its hiring policies are more liberal than you'd expect.

IBM is looking for graduates with good writing skills and the ability to express ideas clearly.

If you were involved in extracurricular activities, you'll also be in good shape. Ralph Mobley, an Atlanta-based consultant at Employment Solutions Corp., an IBM subsidiary in charge of recruiting for IBM, leans toward candidates who have held leadership roles in clubs and school organizations.

Most of the people IBM hires come in as software engineers with skills in C and C++.

Computer science, physics and engineering majors are the focus of IBM's recruiting.

Mobley says IBM does a total assessment of grades, technical know-how and work experience.

In 1992, IBM hired 1,100 college grads, mostly for software development jobs.

Despite layoffs, the company still wants new blood. "We still need new skills to keep us on the forefront," Mobley says. "We need a continuing flow of technical majors."

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Rank	Company	Number of mentions
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2.	AT&T	384
3.	Microsoft Corp.	348
4.	Hewlett-Packard Co.	296
5.	Intel Corp.	267
6.	Apple Computer, Inc.	254
7.	Motorola, Inc.	231
8.	Sun Microsystems, Inc.	195
9.	Digital Equipment Corp.	148
10.	General Electric Co.	113

Source: Computerworld Campus Edition Survey



If you worked at AT&T, you could be sitting next to someone who majored in English or history. That's because the company hires people for information systems positions who have as little as 12 credits of computer science.

"When I came into the company and did my training, my class was filled with all kinds of people, not just computer people," says Debra Burghardt, who received a bachelor of science degree in MIS from Seton Hall University. Burghardt coded and tested customized networks at AT&T for four years before moving over to technical recruiting.

She also gives thumbs-up to the amount of decision-making flexibility the company gave her early on. "We were given the requirements to design a screen, but it was up to us to decide if we wanted to use link list, structures or whatever else," she explains.

Flexibility also stretches to career advancement. An entry-level position can take a person almost anywhere. When Burghardt told her manager she

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wanted to leave the department, he offered to help her find a new job.

But AT&T is inflexible about class rank; it wants its hires to be in the top half of their class. "GPA can mean different things at different schools so we don't consider that as heavily, but we've found a correlation between class rank and job performance," says Susanne Schrott, district manager of university relations and college recruiting at AT&T in Morristown, N.J.

Last year AT&T hired 1,000 people for titles such as associate member/programmer, software developer and business analyst. The company said this year's figures will be lower.

Microsoft®

If you know what you want, Microsoft Corp. may want you. That's what college recruiting manager Jodi DeLeon says. The software giant looks for people who know whether they like to code, crack problems or organize a project. "We are looking for people who will be excited about what they do," DeLeon says.

Software design engineers and software test engineers will need to know C and C++. All candidates can expect technical questions in the interview. Program managers and product managers — an MBA position — need familiarity with the

technology but also business and design knowledge.

But non-MBA staffers can still reach management positions. John Belfiore began working at Microsoft three years ago as an entry-level programmer with a bachelor's degree in computer science from Stanford University. Today, he is responsible for the team designing the user interface for the next version of Windows.

Last year Microsoft hired 180 people, and it expects similar hiring numbers this year. It recruits at 70 schools.

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Put aside your grades and the programming languages you know if you have an interview at Hewlett-Packard Co. HP wants people who work well with others.

"We expect that people coming out of the schools we recruit at will have the technical knowledge we require," says Kathy Burke, college relations and recruiting manager at HP. "What we look for beyond that is people who can work with users and colleagues."

John Palmer, a staffer since 1990, notes that HP has a multicultural work environment. A big plus, he says, is the company's open-door management policy.

HP hired 380 college recruits last year with majors such as computer science and computer engineering. Hires this year should number about 400, with titles such as software development engineer and technology specialist.

As an information technology specialist, for instance, Palmer works on software for internal use for functions such as electronic time cards.

If there's any downside to working at HP, Palmer notes that a smaller company with less infrastructure might allow people to take on responsibility more quickly.

"But a big company like HP gives you a chance to move around departments and try new areas in the company," he says.

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Intel Corp. says it plans to hire about 800 people this year, up from 650 in 1992. To be one of them, you need to have good grades and strong technical skills. A GPA of 3.0 or above is a must.

Majors in computer science, electrical engineering and computer engineering make up the bulk of Intel's hiring, but the company does hire some material science graduates and some chemical engineers.

"We're looking to college grads to keep us up to date on technology so we want

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strong technical know-how," says Charlotte Wells, corporate college recruiting manager at Intel in Folsom, Calif.

Bill Mansfield, a component design engineer at Intel, was hired about a year ago with a bachelor's degree in electrical engineering from Georgia Tech University. For the first 10 months, Mansfield went through Intel's rotation program, working in different areas before settling into his job simulating systems for testing.

Mansfield says a job at Intel requires motivation. Although regular office hours are 8 a.m. to 5 p.m., lots of people work longer.

The company alleviates the stress by funding quar-

terly social gatherings for the staff. There is also no strict dress code.

Wells says one tip she can pass on to applicants is to list courses relevant to the job they want. Not only will this help sell you for the job, but Intel is beginning to use optical scanners, which look for key words on a resume. ■

CONTACT

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- Softball team.

Alice Bredin is a free-lance writer in New York.

Apple Computer, Inc.

Cupertino, Calif.

Hiring numbers: Hired 100 in 1992. Expects to hire only 50 this year because of hiring freeze. **Titles:** Programmers, programmer/analysts, business systems analysts, systems programmers. **Perks:** Education reimbursement, flexible hours, bonuses. **Salary:** Not available. **Contact:** Apple Computer, Inc., 20525 Mariani Ave., Mail Stop 75-2J, Cupertino, Calif. 95014.

Motorola, Inc.

Schaumburg, Ill.

Hiring numbers: Hired 250 to 300 systems staffers in 1992. Expects 5% to 6% increase in 1993. **Titles:** Computer programmers; systems analysts; design engineers; software engineers. **Salary:** Ranges from \$30K to \$43K. **Perks:** Bonuses and internal education. **Contact:** University relations (708) 576-2576.

Sun Microsystems, Inc.

Mountain View, Calif.

Hiring numbers: Not available. **Hot majors:** Computer science and electrical engineering. **Salary:** Not available. **Perks:** Education reimbursement, merit bonuses, fitness center, sports teams, casual dress code. **Contact:** Sun Microsystems, Resume Department, 2550 Garcia Ave., Mail Stop PAL1-423, Mountain View, Calif. 94043-1100.

Digital Equipment Corp.

Maynard, Mass.

Hiring numbers: Not available. **Salary:** Not available.

Perks: Education reimbursement, flexible hours. **Contact:** Digital College Relations, MSO 2-1/E12, 111 Powdermill Road, Maynard, Mass. 01754, (508) 493-9153.

Martin Marietta Corp. (formerly GE Aerospace)

Bethesda, Md.

Hiring numbers: Hired 352 in 1992, with 1993 numbers approximately the same. **Titles:** Entry-level engineers into two tracks, one for direct placement on the job, the other for a six-month technical training program that includes job rotation, technical training and leadership training. **Hot majors:** Computer engineering, electrical engineering.

Salary: Not available. **Contact:** Martin Marietta University Relations Staffing, P.O. Box 8048, Philadelphia, Pa. 19101.

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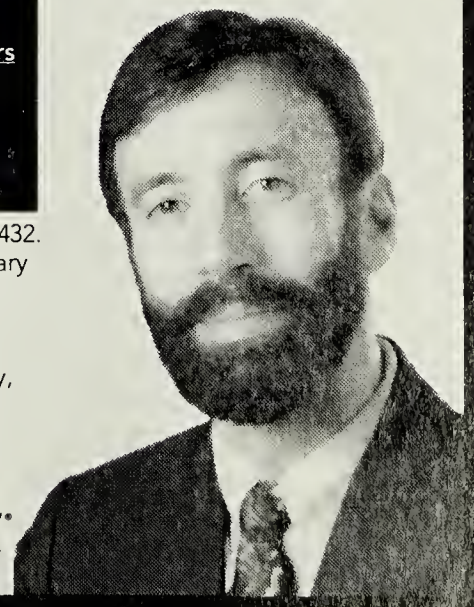
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the white man's club?

Minorities still represent a
small percentage of the
systems work force, especially
at the management level

by julia king

Priscilla Brown is a 34-year-old senior systems programmer and the only black staffer in the 20-member information systems department at Elf Atochem North America, a chemical company in Philadelphia. Before that, she was the only black systems programmer in her group at Cigna Insurance Corp.

"It's usually like that," says Brown, who has a computer science degree.

"Usually like that" indeed. Minorities continue to make limited progress in the IS profession. The U.S. Equal Employment Opportunity Commission (EEOC) notes that in 1991 (the most recent year for which figures are available), 13.9% of IS professionals were minorities. That's only a 1.9% hike from 1988, when 12% of IS staffs were minorities, according to the EEOC.

At the management level, things look even darker. In a recent *Computerworld* survey of 107 IS people, only 10% said their organization's top executive was a minority. The U.S. average is even lower, according to the EEOC, with minorities representing only 8.5% of tech-

nology managers nationwide.

Yes, the old (white) boy network is alive and well and living in corporate technology shops, says Suzanne Fairlie, president of Pro-Search, Inc., a Conshohocken, Pa. IS recruiting firm.

Part of the problem, observers say, is the country's recent economic slump. Virtually all large companies are in some phase of downsizing, which means aggressive budget and staffing cutbacks in IS departments across all industries. Cultivating a culturally diverse work force is not a top priority.

In fact, the *Computerworld* survey found that minority hiring over the last year has been at a standstill. Seventy-four percent of respondents said the number of minorities in their IS organizations has stayed the same, with 7% saying that the

number has actually decreased.

"Companies like IBM that have had a series of [financial] problems aren't focused on cultural diversity programs. They're laying off," says Beverly Lieberman, president and owner of Halbrecht Lieberman Associates in Stamford, Conn.

Profile of a typical systems person

Average title: senior technical staffer/Senior analyst

Sex: 65% male
Race: 86% white
Age: 30s

Average degree: B.A. (with one-third having a degree in computer science, math or engineering)

Source: Halbrecht Lieberman Associates, Stamford, Conn.; Equal Employment Opportunity Commission, Washington

Lieberman estimates that only about one-third of Fortune 1,000 companies have some sort of formal cultural diversity hiring program or policy.

Minorities can expect fierce competition for jobs at all companies, even those such as Chicago-based Kraft General Foods North America, which boasts an in-house cultural diversity program and a history of recruiting candidates from at least one predominantly black college, Howard University in Washington.

Priscilla Brown: **“As a minority, you** **can get lost** **because you’re** **there by yourself.”**

Earlier this year, Kraft hired 10 systems staffers, but for every person hired, three other highly qualified candidates were turned away. “There are fewer jobs and the competition is very keen,” says Willie Fields, who is 54, black and the company’s director of corporate business systems. “We have been able to find minorities who have been able to compete, but they need to know the bar has been raised.”

Fields says that five to seven years ago, a near-3.0 grade point average and a good mind for technology would land a job. He says today’s emphasis is on top-notch qualifications, not enhancing the company’s cultural diversity.

“We’re looking for a B average, outside internships and related activities,” he says.

Promotions stop here

The going gets tough the higher up the ladder.

“In my present job, it’s not an issue at all. But when I worked for a small, private firm many years ago, it was never spoken, but it was known that there was a level of promotion that you could never get past,” says Enrique Crespo Jr., manager of corporate sales systems at Torrington Co., a manufacturing division of Ingersoll-Rand Co.

Michael Hwu, manager of systems and software development at the Four Seasons Hotel in Toronto, thinks the problem comes down to communication. “There’s big money involved [in projects]. You’ve got to convince people of why they have to buy your project.” Hwu says he’s

Four Seasons.

Like Hwu, Elf Atochem’s Brown says she doesn’t believe her chances for advancement are impeded because she is a minority. Still, she says she can’t help but notice that only a very small percentage of minorities hold high posi-



Nick Kelsch

seen few minorities with the skills it takes to present a project.

Lieberman notes that minorities may be caught in a vicious cycle; with so few minorities at high levels, most can’t gain the presentation and management skills needed to get noticed, which may hinder advancement.

Hwu, 38, admits that his rise from programmer/analyst to management may have been easier than most because he got involved in a company without an established IS presence. (He was one of two original IS staffers.) There were no predisposed notions of the typical IS person and no “political mountain” to climb to get ahead.

Despite Hwu’s example, however, he is currently the only minority on the 16-member IS staff at the

tions in IS organizations. Women, for instance, held the top IS jobs at only 15% of the 107 companies *Computerworld* surveyed.

“You have to question whether human resources departments are getting information about jobs out to minorities,” Brown says.

Are there any bright spots? Fairlie says she is beginning to see more companies, primarily those in heavily market-driven industries like pharmaceuticals and cable TV, actively recruiting minority management candidates and grooming minorities already on the job for upper level posts.

When it comes to integrating, companies may not have a choice. According to the 1991 government study *Workforce 2000*, only 15% of entrants to the work force in the

year 2000 will be white males. In 1991, that figure was 47%. Between 1991 and 2000, nearly two-thirds of workers joining the employment ranks will be women.

Over the years, certain progressive companies, including Johnson & Johnson, John Hancock Insurance Co., 3M Co. and General Electric Co., have established positive track records in cultural diversity, according to executive recruiter Lieberman.

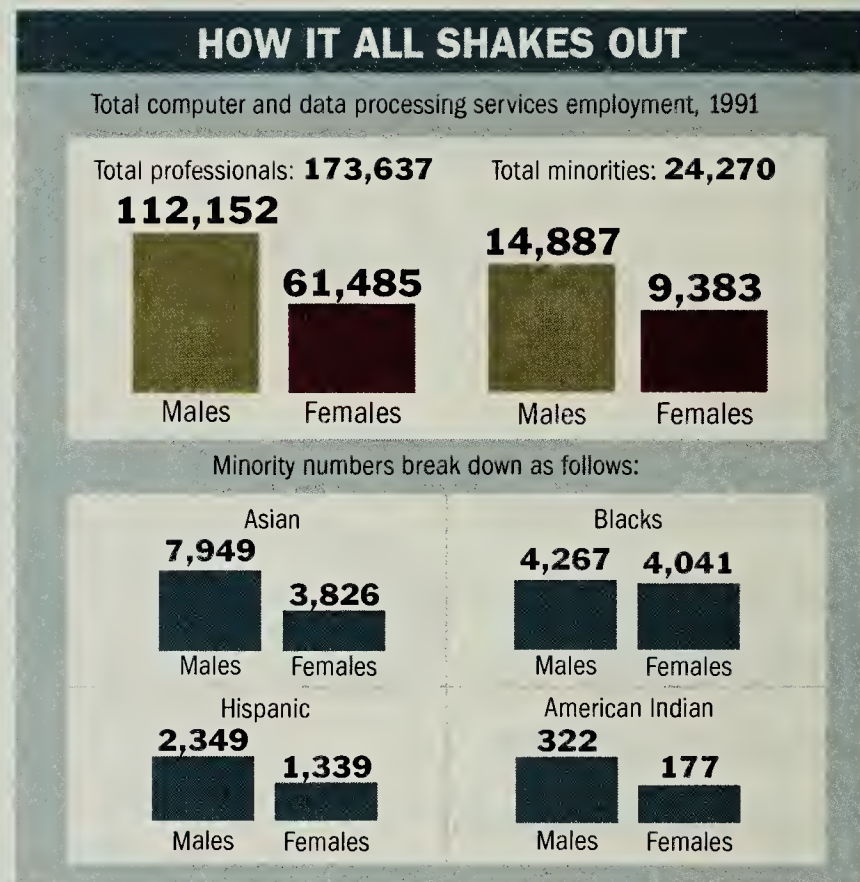
Unfortunately, Lieberman notes, these companies are all outside the financial services and telecom industries, which, for now, is where almost 50% of the IS jobs are.

Yet Lieberman isn't enthusiastic about minority representation in the ranks of financial service companies.

"It's only in companies where there is a proactive human resources executive who has the ear of the president that cultural diversity programs are strong," she says. "And in financial services, brokerage and investment banking, human resources has traditionally been weak."

Earl Pace, president of Pace Data Systems, Inc. and co-founder of Black Data Processing Associates (BDPA), says there is truth to the statement that companies are preparing for the upcoming change in workforce demographics by establishing cultural diversity programs.

"They see the handwriting on the wall," Pace says. "But the attitude is, 'Let's do this thing as slowly as we can.' I don't see corpora-



Source: Equal Employment Opportunity Commission, Washington

tions moving ahead with any deliberate speed. It's window dressing for now."

Kraft's Fields says he, too, does not see companies moving ahead with cultural diversity programs.

"Public relations is the primary issue today," he says. "[True] cultural diversity will be more of a 1998-99 issue."

For now, any success is bittersweet. Brown says that while she has not had any direct experience with on-the-job discrimination, she has seen it in places where she has worked. And it has been hard to rise

through the ranks without feeling both uncomfortable and isolated as a black woman in an overwhelmingly white male profession.

"As a minority, you can get lost because you're there by yourself and have no one else to recognize your experiences," Brown says. "You feel that isolation. It may not be intentional [on the part of nonminority employees], but still you feel it." ■

Julia King is a free-lance writer in Ridley Park, Pa. Campus Editor Lory Zottola-Dix contributed to this report.

Young hopefuls

by jean s. bozman

a career in information technology may seem a remote possibility to many inner-city minority children, but a group of IS professionals is working to prove to them that such a career is within reach.

The Black Data Processing Associates, a 17-year-old group based in Washington, sponsors a national series of computer competitions that reaches out to more than 2,000 students in 23 cities. The competition caps a year of study and competition at high schools around the country.

The IS professionals involved say they feel rewarded from the mentoring program, too, especially when one of the students ends up being a colleague. "We've been watching these kids grow up," says Roger Dunn, president of the New York BDPA chapter. "They could walk into any work environment and be a valued asset."

Some kids have won college scholarships or gained summer internships. Summer interns, for instance, learn about the importance of coming to meetings on time and practice programming skills using IBM-compatible PCs.

"It's opened a lot of doors for me," says Leticia Williams, a senior at Von Steuben High School in Chicago.

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Circle G4

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To receive information about a specific graduate school listed, circle the index number below for the corresponding graduate school.

Type or print clearly. Complete entire form. Mail as soon as you can.

Your name: _____

Permanent Address: _____

City: _____ State: _____ Zip: _____

Your ☐ current college/university or ☐ alma mater: _____

Is the school name part of address above? ☐ Yes ☐ No.

Year: ☐ Jr ☐ Sr ☐ Grad.Stu. ☐ Alumni ☐ Staff ☐ other _____

Your ☐ current or ☐ previous program: ☐ BA ☐ BBA ☐ BS ☐ Master's ☐ Ph.D
major/concentration: _____

Which programs interest you? ☐ Master's ☐ Doctoral ☐ Full/☐ Part-time ☐ Business
☐ Information ☐ Computer ☐ Other

When do you expect to enroll? ☐ September 1994 ☐ other

Permanent Phone (Include Area Code): _____

Best time to call: _____ ☐ AM ☐ PM Is this ☐ home ☐ work ☐ school?

Proficiencies: Is English your ☐ first or ☐ second language? Do you use a computer?
☐ Yes ☐ No. If Yes, for ☐ word processing, ☐ data processing, ☐ Graphics
☐ Programming, ☐ other _____

Please list names of schools that you are personally writing or calling:

Graduate Education 1993 - 1994

G1	G7
G2	G8
G3	G9
G4	G10
G5	G11
G6	G12

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To receive information about a specific graduate school listed, circle the index number below for the corresponding graduate school.

Type or print clearly. Complete entire form. Mail as soon as you can.

Your name: _____

Permanent Address: _____

City: _____ State: _____ Zip: _____

Your ☐ current college/university or ☐ alma mater: _____

Is the school name part of address above? ☐ Yes ☐ No.

Year: ☐ Jr ☐ Sr ☐ Grad.Stu. ☐ Alumni ☐ Staff ☐ other _____

Your ☐ current or ☐ previous program: ☐ BA ☐ BBA ☐ BS ☐ Master's ☐ Ph.D
major/concentration: _____

Which programs interest you? ☐ Master's ☐ Doctoral ☐ Full/☐ Part-time ☐ Business
☐ Information ☐ Computer ☐ Other

When do you expect to enroll? ☐ September 1994 ☐ other

Permanent Phone (Include Area Code): _____

Best time to call: _____ ☐ AM ☐ PM Is this ☐ home ☐ work ☐ school?

Proficiencies: Is English your ☐ first or ☐ second language? Do you use a computer?
☐ Yes ☐ No. If Yes, for ☐ word processing, ☐ data processing, ☐ Graphics
☐ Programming, ☐ other _____

Please list names of schools that you are personally writing or calling:

Graduate Education 1993 - 1994

G1	G7
G2	G8
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G5	G11
G6	G12

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University of Virginia, Monroe Hall
Charlottesville, VA 22903
(804) 924-3571



University of Virginia

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Circle G6

The Graduate Education Listings in Computerworld's Campus Edition are the perfect way to cost-effectively recruit top candidates for your graduate program -- because Computerworld's Campus Edition targets only the best students in America's top computer degree programs. For more information, call or write:

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Write or call: Nova University - CCIS, 3301 College Avenue
Ft. Lauderdale, FL 33314
1-800-986-2247 or (305) 475-7352

 **NOVA UNIVERSITY**

Circle G7

UP & COMERS

chris j. lane

Degree: Bachelor's degree in computer science, Carnegie Mellon University, 1988.
Current title/company: Technical marketing manager, Future Pentium Processor Products, Intel Corp., Santa Clara, Calif.

When you see the sticker "Intel Inside" on a PC, you can think of Chris Lane, who was recently promoted to technical marketing manager for Pentium, the next generation of microprocessors from Intel. Lane's job takes him all over the world to work with Intel customers, from IBM to NCR Corp. to Compaq Computer Corp.

"I just got back from the business trip

from hell — from California to Europe to see five customers in four days and back again," he says.

He describes landing his job, which he started the July after graduation, as a mixture of "luck and good fortune." Most chip makers like to hire people with electrical engineering degrees, which he doesn't have.

But Lane did everything he could to concentrate in electrical engineering. He took most of the core curriculum in addition to his other coursework. He has also built his own PCs and worked on circuit designs for a maker of hotel-room minibars.



William McLeod

"It was mostly my experience and my ability to apply practical information that cinched the job," he says. "I think that when I interviewed I was relatively charismatic. I had been a salesman at Radio Shack, where we worked on commission, so I knew how to sell myself."

—Leslie Goff

PROGRAMMER TRAINEES

The challenge: Help us define a system's architecture. **The place:** Prudential Securities' new state-of-the-art trading, computing and operations complex in the Wall Street area.

To help us provide the computer systems and telecommunication services necessary to solve increasingly complex business issues, we seek recent 1994 college grads for our Programmer Trainee Program. To be considered, candidates must have a degree in Computer Science or Electrical Engineering. Knowledge of PCs is required, programming experience is helpful but not mandatory.

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Where is the industry headed?

by joe panepinto

Philippe Kahn

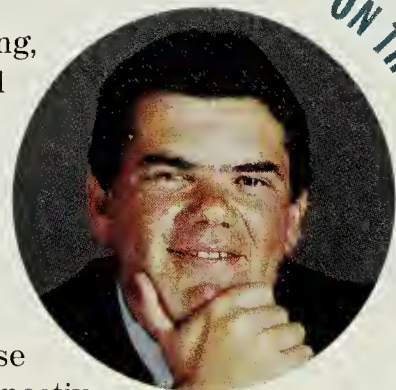
Chief executive officer
Borland International, Inc.
Scotts Valley, Calif.

"PC software is entering a very exciting growth phase in the business. Both end users and [technologists] are looking for solutions that are easy to install and maintain and that extend productivity while maintaining the training/knowledge and custom application investments of desktop software standards already in place. Two striking examples of this trend are in client/server computing and workgroup computing.

In client/server computing, the shift to downsizing and moving mainstream computer operations to the desktop level is really taking place now. Client/server architectures are now possible with robust front-end tools, desktop database products that offer SQL connectivity and advanced data access and joining features, while servers are becoming popular at the departmental level.

Users are looking for solutions that are easy to install and maintain and that dramatically improve productivity by giving users the decision support information they need.

With workgroup computing, users are looking to enhance productivity with workgroup features within the desktop applications they use every day. They don't want to be tied to a dedicated system that makes them conform to a particular work style. They want applications that are portable, cost-effective and easily deployed."



ON THE SPOT

QUICK PICKS

- Object-oriented programming and C++.
- Workgroup technology.

Lew Platt

President and CEO
Hewlett-Packard Co.
Palo Alto, Calif.

"We see a future where computing is pervasive, where computing, communications, consumer electronics and, eventually, education and entertainment come together.

This pervasive computing vision is propelled by the convergence of what people need and what technology makes possible.

By the end of the decade, you will be able to have any information you want or communicate with anyone you want to, anywhere, anytime. For example:

- You won't have to read articles and reports because you might need the information at a later point. When you require data on a topic, you will simply ask your information tools to find it and sort it for you.
- You will talk to experts 'face to face' through your television to receive advice on anything from remodeling your bath-



ON THE SPOT

room to treating a bee sting.

• Your children's education will benefit; for example, when your daughter prepares a report on American history, she will download a document from the Library of Congress onto your home PC.

People want to be free of time and location constraints. They want products that are familiar, easy to use and intuitive. They want the ability to communicate easily across long distances, and they want to take action and get results based on this communication."

QUICK PICKS

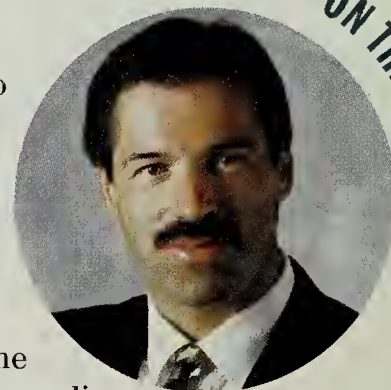
- Software, including object technology.
- Computer architecture.
- Networking to handle multiprocessing systems and more complex client/server setups.

Craig Benson

CEO
Cabletron Systems, Inc.
Rochester, N.H.

"The industry is headed to more client/server. It is headed where American business is headed — away from managers dictating things and toward more team-oriented approaches.

For example, everyone shares a piece of building an application and the maintenance of it. No longer do we have dumb employees sitting at dumb terminals. The organization is more consensus- and team-oriented. This is the way business is going to run now — there will be an elimination of the top-down approach to building a company and running an IS department."



ON THE SPOT

QUICK PICKS

- Software, especially any having to do with client/server.
- Object-oriented software development and C++.
- Hardware engineering/manufacturing training. Hardware engineers need to know how to cost/benefit the products they design and how to design quality products at a good cost-for-manufacture.

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David House

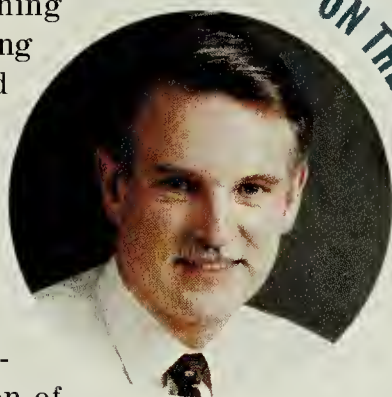
Vice president, strategic planning
Intel Corp.
Santa Clara, Calif.

"I think the most exciting thing happening now is the merging of telecommunications and computing. In the past, we would create documents with databases, spreadsheets and word processors and print all this stuff out and mail it.

Now all of this — the creation and the communication of information — is happening electronically. The computer is no longer for computing things but for communicating.

At the same time, miniaturization is making this technology personal. I travel with a notebook computer and cellular phone everywhere I go. I'd really like to combine those two features and do all my computing and communicating with a single device. I'd also really like to use more natural or human data types like speech, full-motion video, sketches, doodles. That is the way people like to interface.

As computers continue to gain power and memory capacity, we'll see a continual bridging of the gap between human and computer interfaces."



ON THE SPOT

When NCR recruited on campuses 10 years ago, we looked primarily for people with strong computer backgrounds. These graduates had taken the core computer curriculum. This education provided adequate background for employment in the mainframe-centric world.

With the advent of client/server computing, companies like NCR are now looking for graduates with more diversity in their backgrounds — business-minded [people] with strong communication skills. This new communicative, open-minded IS professional is better able to discuss with users what they need from their information technology and work together to implement easy-to-use, efficient systems." ■

QUICK PICKS

- Client/server computing.

Joe Panepinto is a free-lance writer based in Amherst, Mass.

QUICK PICKS

- Natural data types, video, sound and handwriting recognition.
- Miniaturization and interface technologies.
- Software is where the value is.
- Technologies for electronic meetings and groupware meetings.

James K. Hull

Vice president,
Corporate Information
Systems and Services Division
NCR Corp.
Dayton, Ohio

"Fueled by the steady decline in computer prices, the industry has moved away from centralized processing in favor of distributed, client/server computer processing. This change in the computer industry is changing job responsibilities.



ON THE SPOT

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- Sort/Merge Theory
- Data Structures
- Data Management

Backgrounds we desire include a degree in Computer Science, EE, Math or Physics and familiarity with Assembler or C.

Please mail a resume to Syncsort Inc., Attention: CW Recruiting, 50 Tice Boulevard, Woodcliff Lake, NJ 07675.

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At last, the gap narrows

by c a n d e e w i l d e

When Revell J. Edelman, now vice president of data processing at Columbia Savings Bank SLA in Fair Lawn, N.J., circulated her resume 10 years ago, most employers assumed she was a man.

"When they called and found out

I was a woman, 50% hung up," she recalls. "The discrimination was horrendous."

What a difference a decade makes. If *Computerworld's* Annual Salary Survey is any indication, things have improved even during the last 12 months.

In our 1992 survey, many women

in information systems, especially managers, reported earnings that were up to 20% lower than those of their male counterparts. Now, however, the tide appears to be changing — dramatically. Women are closing the gap between their earnings and the higher sums typically paid to their male colleagues.

Operating systems programmer

Average: \$39,583 Bonus: \$1,505 Total: \$41,088

INDUSTRY		REGION	
Utils.	\$48,333	N.Y.	\$46,400
Insurance	\$44,875	Texas	\$44,285
Govt.	\$43,852	Florida	\$42,000
Trans.	\$42,000	Chicago	\$41,000
Retail	\$40,750	Denver	\$40,600
Nonprft.	\$40,000	N.Calif.	\$40,125
Banking	\$39,000	Boston	\$39,757
Health	\$39,000	S.Calif.	\$39,400
Securities	\$38,000	Balt./D.C.	\$39,000
Education	\$37,300	Detroit	\$38,681
Mfg.	\$36,924	Ariz.	\$38,333
Media	\$35,000	Atlanta	\$35,833
Bus. Svc.	\$34,922	Pacif. NW	\$35,255
Computer	\$20,500	Other	\$33,500
Real Est.	\$0	Minn.	\$31,500

Business analyst

Average: \$40,530 Bonus: \$1,888 Total: \$42,418

INDUSTRY		REGION	
Computer	\$51,500	Other	\$57,500
Bus. Svc.	\$50,833	Balt./D.C.	\$49,714
Govt.	\$45,750	N.Y.	\$48,333
Mfg.	\$42,933	Florida	\$45,750
Trans.	\$41,500	Detroit	\$45,166
Health	\$40,500	Denver	\$43,200
Nonprft.	\$38,000	N. Calif.	\$41,400
Insurance	\$37,950	Chicago	\$40,228
Education	\$37,500	Boston	\$40,166
Utils.	\$36,500	Pacif. NW	\$39,928
Retail	\$35,500	S. Calif.	\$38,625
Securities	\$35,000	Minn.	\$35,000
Banking	\$31,085	Texas	\$31,150
Media	\$27,000	Ariz.	\$31,000
Real Est.	\$0	Atlanta	\$27,000

Systems analyst

Average: \$40,598 Bonus: \$1,852 Total: \$42,450

INDUSTRY		REGION	
Trans.	\$45,666	N. Calif.	\$50,214
Retail	\$43,615	S. Calif.	\$46,090
Utils.	\$42,285	N.Y.	\$44,944
Govt.	\$42,100	Ariz.	\$43,600
Insurance	\$42,062	Chicago	\$43,107
Mfg.	\$41,697	Florida	\$41,100
Media	\$41,666	Texas	\$41,088
Health	\$39,718	Pacif. NW	\$40,045
Computer	\$38,610	Detroit	\$39,500
Securities	\$37,500	Atlanta	\$39,184
Education	\$37,230	Denver	\$39,081
Banking	\$35,857	Boston	\$37,615
Nonprft.	\$35,000	Minn.	\$37,266
Bus. Svc.	\$32,959	Balt./D.C.	\$35,429
Real Est.	\$0	Other	\$28,000

Senior programmer/Analyst

Average: \$42,659 Bonus: \$1,796 Total: \$44,445

INDUSTRY		REGION	
Media	\$48,888	N. Calif.	\$50,208
Utils.	\$46,916	N.Y.	\$47,763
Banking	\$45,458	S. Calif.	\$46,696
Insurance	\$45,360	Boston	\$44,346
Mfg.	\$43,800	Texas	\$44,240
Trans.	\$43,529	Balt./D.C.	\$43,742
Govt.	\$42,550	Detroit	\$42,521
Securities	\$42,200	Atlanta	\$42,476
Nonprft.	\$41,333	Chicago	\$41,578
Retail	\$41,238	Minn.	\$41,480
Computer	\$40,687	Florida	\$40,880
Bus. Svc.	\$40,679	Ariz.	\$40,743
Health	\$38,951	Denver	\$39,593
Real Est.	\$38,000	Pacif. NW	\$38,987
Education	\$35,826	Other	\$28,250

Overall compensation for the 1,239 IS professionals polled rose a modest 4% this year. Pay for some positions, including chief information officer, rose a bit more. Others did less well. In a number of companies, bonuses, not pay raises, have become the favored reward. On average, women still earn less than men for similar jobs.

Women in control

But the rapidly expanding ranks of more-experienced women seem likely to change that. This year's poll showed unmistakably that women are moving into more responsible, higher-paying IS jobs.

As LAN managers, for instance, women hold 42.9% of the positions, compared with 31% last year. Similarly, the percent of women serving

as PC end-user specialists jumped from 45% in 1992 to 58% this year.

IS remains a strong male bastion, though: Two-thirds of those polled were men, a pretty decent representation of the computing population at large.

Benefit preferences tell part of the story. Traditionally, men held high-level posts because, Edeleman and others note, women didn't want to work the "crazy hours" associated with those jobs. Some women say they feel that accounts for their historically lower pay.

Our poll found that hasn't changed too much: Many women said they preferred more regular hours. They were also more likely to take advantage of flexible-time programs or part-time work.

While fortunes varied by posi-

tion, industry and region, few are getting clubbed or starved this year (see charts). According to Jay

Vertical descent

BANKING, UTILITIES and SECURITIES firms took the biggest pay hits this year.

INSURANCE companies showed the biggest increases for many positions.

Programmer/Analyst

Average: \$35,751 **Bonus:** \$1,977 **Total:** \$37,728

INDUSTRY		REGION	
Real Est.	\$46,000	N.Y.	\$42,119
Media	\$40,071	N. Calif.	\$41,676
Utils.	\$38,156	S. Calif.	\$37,742
Insurance	\$37,348	Balt./D.C.	\$37,651
Govt.	\$37,214	Texas	\$37,322
Mfg.	\$36,524	Detroit	\$37,109
Trans.	\$35,918	Chicago	\$36,263
Banking	\$35,285	Florida	\$35,100
Securities	\$35,166	Pacif. NW	\$34,519
Health	\$34,466	Minn.	\$33,695
Nonprft.	\$34,428	Atlanta	\$33,615
Retail	\$34,177	Boston	\$33,597
Education	\$32,588	Denver	\$33,101
Bus. Svc.	\$31,751	Ariz.	\$32,171
Computer	\$31,116	Other	\$26,000

Senior programmer

Average: \$39,777 **Bonus:** \$1,274 **Total:** \$41,051

INDUSTRY		REGION	
Mfg.	\$44,159	N. Calif.	\$53,388
Real Est.	\$43,000	S. Calif.	\$45,000
Govt.	\$41,552	Ariz.	\$44,928
Health	\$41,428	N.Y.	\$44,833
Insurance	\$40,000	Other	\$43,000
Media	\$40,000	Texas	\$40,700
Trans.	\$39,750	Boston	\$40,428
Retail	\$39,562	Denver	\$40,125
Banking	\$39,125	Chicago	\$39,500
Bus. Svc.	\$34,700	Detroit	\$39,500
Utils.	\$32,506	Pacif. NW	\$38,388
Education	\$30,000	Atlanta	\$36,750
Securities	\$30,000	Minn.	\$35,750
Computer	\$16,027	Balt./D.C.	\$31,799
Nonprft.	\$0	Florida	\$30,750

Programmer

Average: \$30,491 **Bonus:** \$1,674 **Total:** \$32,165

INDUSTRY		REGION	
Media	\$35,000	N. Calif.	\$40,846
Real Est.	\$34,000	N.Y.	\$34,090
Nonprft.	\$33,666	S. Calif.	\$33,642
Insurance	\$32,333	Texas	\$31,520
Govt.	\$32,050	Ariz.	\$31,041
Trans.	\$32,000	Boston	\$30,937
Banking	\$31,083	Chicago	\$30,652
Mfg.	\$30,698	Atlanta	\$30,366
Securities	\$30,400	Detroit	\$30,000
Health	\$29,857	Balt./D.C.	\$29,172
Retail	\$29,133	Denver	\$28,882
Education	\$28,107	Minn.	\$28,470
Utils.	\$26,153	Pacif. NW	\$27,681
Bus. Svc.	\$26,102	Florida	\$26,044
Computer	\$25,761	Other	\$22,300

Senior operating systems programmer

Average: \$48,867 **Bonus:** \$1,878 **Total:** \$50,745

INDUSTRY		REGION	
Retail	\$54,125	N. Calif.	\$64,083
Securities	\$53,500	N.Y.	\$62,416
Utils.	\$53,250	Other	\$59,500
Trans.	\$53,125	Boston	\$54,142
Banking	\$52,666	Chicago	\$50,653
Bus. Svc.	\$52,333	Detroit	\$50,388
Insurance	\$51,083	Balt./D.C.	\$50,071
Computer	\$50,166	Florida	\$49,222
Govt.	\$49,864	Texas	\$47,944
Health	\$49,555	Atlanta	\$47,461
Media	\$47,666	Pacif. NW	\$44,546
Mfg.	\$47,032	Denver	\$44,000
Education	\$41,777	Ariz.	\$42,444
Nonprft.	\$19,000	Minn.	\$41,214
Real Est.	\$0	S. Calif.	\$41,166



SOUTH HOT,

ATLANTA, PHOENIX and DALLAS showed healthy salary increases for many jobs, including **CIO**.

Less fortunate were **IS** workers in **BALTIMORE, DENVER, NEW YORK, MINNEAPOLIS** and **NORTHERN CALIFORNIA**. In those cities, pay for some jobs actually fell this year.

NORTH COOL

Gaines, president of recruiter Jay Gaines & Co. in New York, that doesn't necessarily mean IS can start looking for hefty bonuses and compensation hikes like in the old days.

"The ongoing themes are re-engineering and streamlining, and that means companies are going to run significantly leaner," Gaines said.

Other experts say continued corporate downsizing remains a big threat to IS pros, especially those who don't keep up with rapidly developing technology.

Ups and downs

A notable bright spot is CIOs. Technology bosses enjoyed a 2.8% hike, a stark contrast from last year's 3.5% decline. Many recruiters report that CIO recruiting has surged in 1993 after several lackluster years.

At the other end of the spectrum, help desk operators (where women outnumber men) suffered a painful 8.9% drop in pay. Experts differ on what the dip means.

Larry Kane, president of Alternative Resources Corp. in Lincolnshire, Ill., says it's possible that many help desk operators may have failed to keep up with technology development; thus, their salaries fell. Last year, help desk operators earned an average salary of \$30,873, with average additional compensation of \$1,049. This year, average salaries dipped to \$27,260, with the typical bonus falling to \$850.

Scott Novey, manager of microcomputing and communications at Sola Optical, Inc. in Petaluma, Calif., reports that salary increases at his company reflect this trend. In the past, Sola Opti-

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cal's IS employees had been at the "higher end of the pay scale," he says.

"The company has elected to make itself more mainstream and position itself more in the middle of the pay range. Consequently, merit increase percentages have been declining slowly," he says.

Bonus babies

Sola Optical offers two bonus programs: One uses a formula based on the company's profit level and the employee's salary, while the other, for managers, is "goal-oriented," he explains, based on the degree to which a manager meets a set of objectives established with a supervisor.

Kristyn Gomes, an MIS supervisor at Calcitek in Carlsbad, Calif., says her company developed a salary matrix

based on job points, which are awarded during an annual performance review with a supervisor.

"This way, you can see how you're in line with other people with the same number of job points even if they don't have the same job," she says.

For those who persevere and excel, bonuses are now the preferred tidbit.

Electroglas in Santa Clara, Calif., illustrates a trend popular among small-

er companies. Bonuses are tied to company profits and to an individual's performance, says J. B. Shah, the company's director of MIS/telecommunications. Bonuses give employees a chance to enhance the modest salary increases — 3% to 6% — of the past few years.

That policy is echoed by the survey. Most respondents say they believe salaries for their positions are no better elsewhere. Many say they feel bonuses should be the true vehicle of compensation for superior work.

Thus Edelman and other women are opting to stay put, convinced that the cash isn't necessarily greener elsewhere. Stay tuned. ■

Candee Wilde is a free-lance writer in Easton, Conn.

METHODOLOGY

Computerworld's Seventh Annual Salary Survey includes responses from 1,239 information systems professionals. Names were selected from lists supplied by the Association for Systems Management, the Applied Computer Research directory, *Computerworld's* subscriber base, the *Computerworld* Buyer's Database and the 1992 *Premier 100*. Surveys were mailed on June 23 and results tabulated by IDG Research Services in Framingham, Mass.

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Senior Editor Ellis Booker
got the scoop on what kind
of experience technical
managers want you to have.

"A computer science background is useful. It should be heavily laden with course work in behavioral sciences, such as organizational theory, group psychodynamics and psychology. Successfully deploying new technologies is built around an understanding of people and their reactions to change."

■ Mark Barmann, group vice president and CIO, Charles Schwab & Co., San Francisco

"I'm probably not interested at all in academic background. I'm much, much more interested in people who are open-minded, self-motivated and quick to learn the business. If you can't make that connection, chances are there is going to be a lot of wasted effort."

■ Bruce Folger, director of Advanced Technology and Resource Management, Variable Annuity Life Insurance Co., Houston

"I've stood at the specialist trading posts on the exchange floors and watched firsthand how users handle trades. Get out and talk to the customer. I think it's more important than being technically brilliant."

■ George Kenney, executive director of IS, Swiss Bank Corp., Chicago

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Career assist

Free advice. No kidding. We rounded up some career questions from real students and got a recruiting bigwig to answer them. Hope the answers give you insight on what's important.

David Brown
Majoring in information systems
Brigham Young University
Provo, Utah

Question: What programming languages is it beneficial for me to know in the business world?

Answer: With the variety of systems in use today, it's helpful to know several languages. Programming languages to know in the business world are C, Cobol, Fortran, PL/1 and Pascal.

Question: What specific computer/technical fields are booming?

Answer: The hot computer/technical fields are workstations and other desktop computing or client/server areas.

Mike Jansen
Associate's degree in telecommunications
Waukesha County Technical College
Pursuing computer science degree
Milwaukee School of Engineering

Question: What jobs are available for someone with a bachelor's degree in computer science and an associate's degree in telecommunications?

Answer: Jobs that combine computer science and telecommunications degrees are application programming and network administration.

Angel Hurley
Majoring in computer engineering/computer science
University of Southern California
Los Angeles

Question: What technical skills are highly recognized in the computer industry?

Answer: You should acquire expertise in Unix and its derivatives, relational databases, computer graphics and spreadsheets such as Lotus Development Corp.'s 1-2-3.

Other hot areas are image processing and multimedia.



Gerald Bustamante

Shelby Williams
Majoring in computer and electrical engineering
University of Southwestern Louisiana
Lafayette, La.

Question: While I am in school, what specifically should I be doing to help myself land a job in my field after graduation?

Answer: You should maintain top grades, network through professional associations and try to get summer em-

ployment on a computer help desk or in a related area.

Look into co-ops and internships, and join various campus organizations. Hands-on experience helps you test your skills and learn to work well with others.

Terry McCall
Pursuing master's degree in computer science
University of Illinois
Champaign-Urbana, Ill.

Question: What are the management possibilities in software engineering?

Answer: This varies from company to company. At some companies, the prospective manager first establishes his credentials as a technical professional before being considered for a management position.

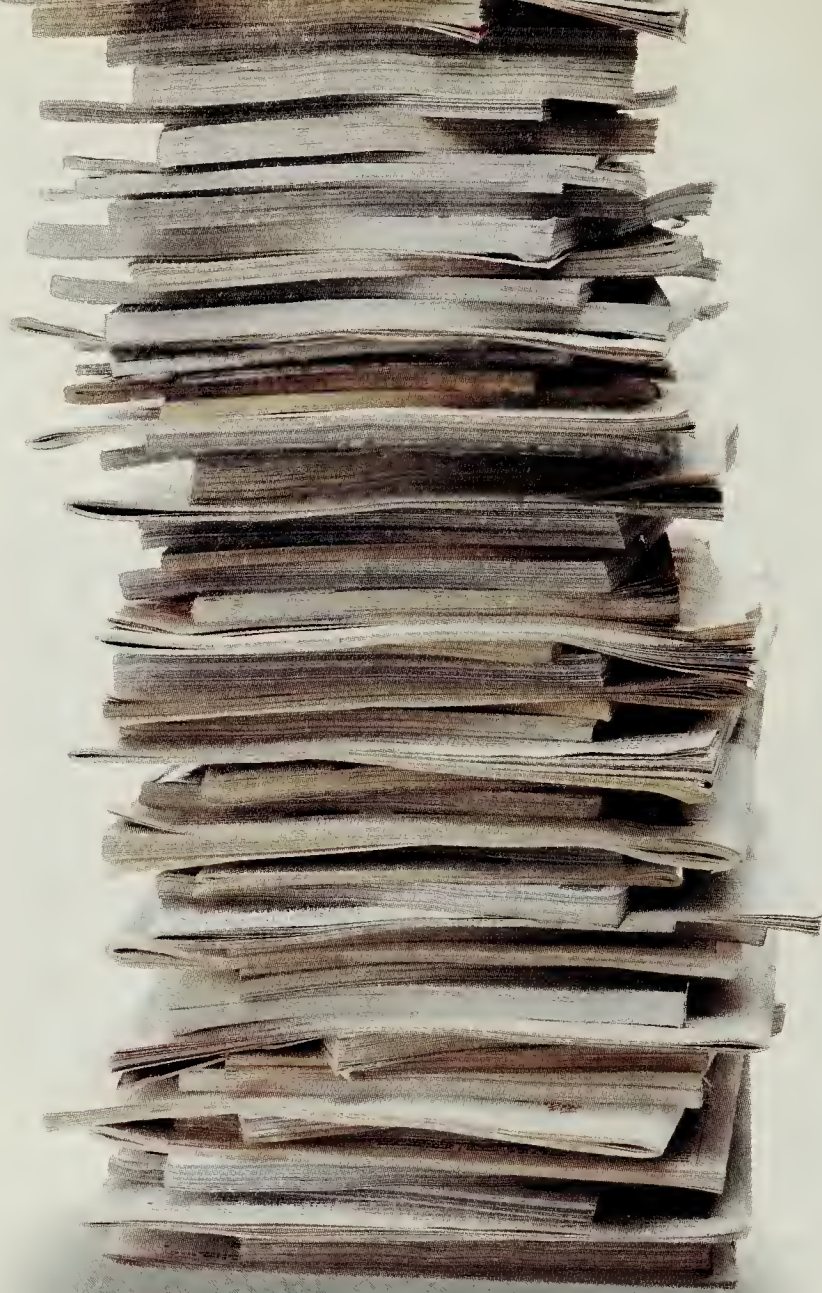
It is rare for someone to be hired into a management position directly out of college.

Timothy Miller
Pursuing MIS degree
Wright State University
Dayton, Ohio

Question: Should I study client/server or mainframe technology? Which would benefit my career more?

Answer: It's extremely valuable to study both mainframe systems and client/server technology. It's not a matter of studying one or the other. You need a well-rounded knowledge of both types of systems. ■

Questions were compiled by assistant researcher Stefanie McCann. Responses were given by Kenneth Lay, president of IBM's Employment Solutions Corp. subsidiary.



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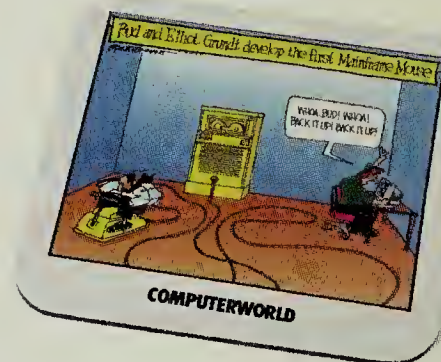


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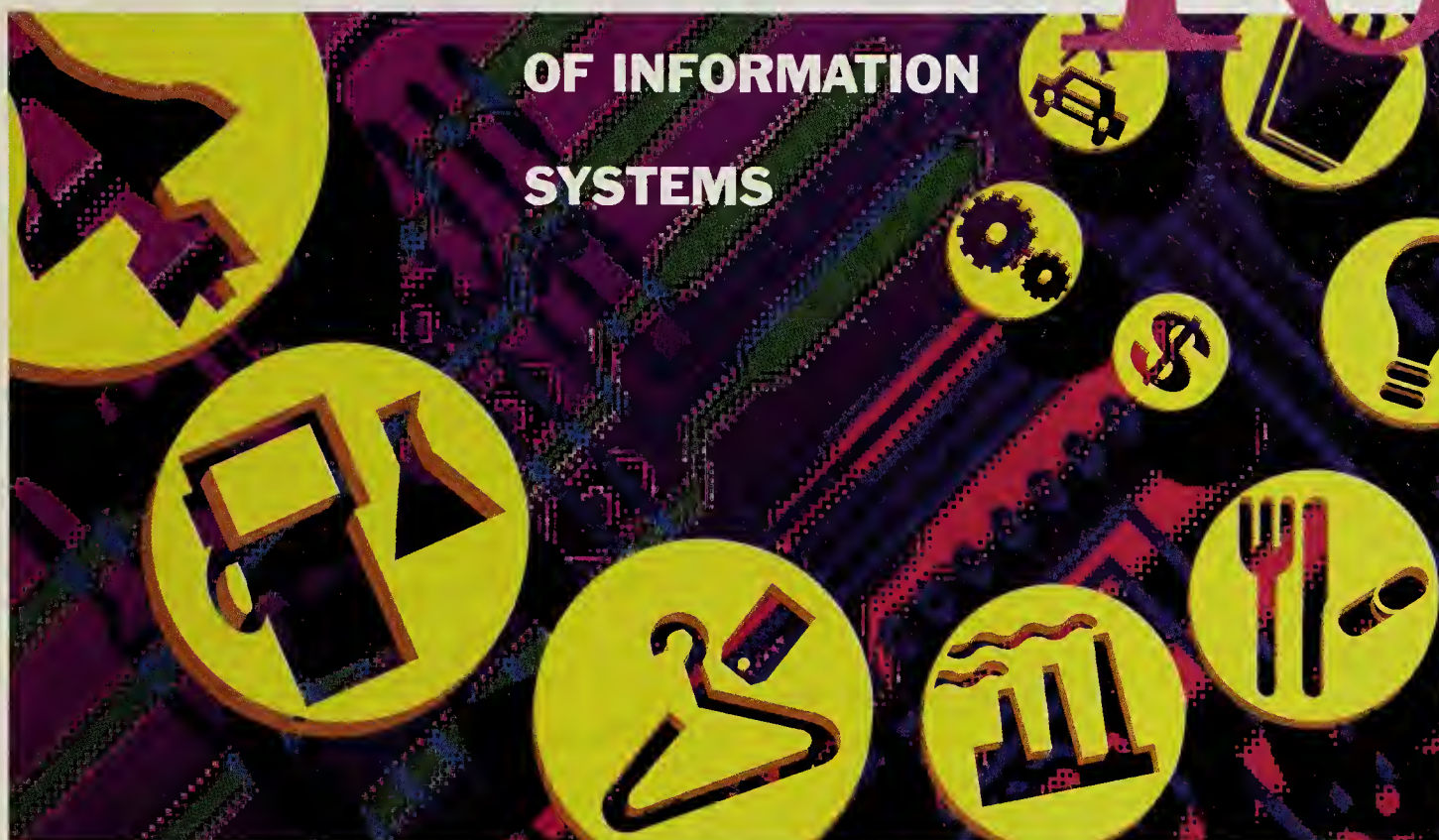


COMPUTERWORLD
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The Premier 100

THE MOST
EFFECTIVE USERS

OF INFORMATION
SYSTEMS



by joanne kelleher

If you're aiming for a job with a company where technology really counts, but you don't particularly want to be in the computer industry, the names on *Computerworld's* Premier 100 list are probably your best bets.

The Premier 100 is *Computerworld's* annual ranking of U.S. companies that make the most effective use of information technology. On the following pages (pages 48-49) you'll find the Premier 100 list, a who's who of the best prospective employers for business-minded technologists.

But before you go knocking on any doors, it might be helpful to know a little about how these companies use information technology and the kinds of skills they are seeking.

First of all, bone up on C++, Visual Basic, PowerBuilder and other client/server application development tools. Forty-five percent of Premier 100 companies said these tools would be the

most critical in the next five years. However, only 26% currently have a target date for downsizing most of their applications.

Companies have been slow to take the plunge for a number of reasons. Budgets for information systems have been tight, and staffs are decreasing.

Don't panic, though. That news isn't as bad as it sounds. Not all the money or all the jobs have actually gone away. At more than half of these companies, funding for technology resources has shifted from the central IS department to operational units.

So don't expect to be a pure code jockey. These days, a lot of the job is mixing, mingling and brainstorming with business folks and figuring out how to improve work processes.

In fact, that's what "effectiveness" means to more than 60% of technology chiefs at Premier 100 companies: finding and designing solutions for inefficiencies without being asked to do so. In the help wanted pages, this is called being a self-starter.

Client/serverizing

Most IS organizations say client/server will be the most critical technology for competitive success in the next five years

Client/server	45%
Open systems	20%
EDI	17%
Object-oriented	13%
Distributed RDBMS	8%
Wireless	8%
LANs	6%
EIS	5%
Imaging	3%
Groupware	3%
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The Premier 100

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UP & COMERS

kathie hall

Degree: Bachelor's degree in business computer information systems, University of North Texas, Denton, Texas, 1988.

Current title/company: Senior systems analyst, Merchandise Systems, JC Penney Co., Dallas

Kathie Hall's Cobol skills got her into JC Penney's merchandising systems department, but her tenacity and adaptability in her position carried her into the development of critical, PC-based, on-line applications.

Using Microsoft Corp.'s Excel macro languages, she's building applications that

support merchandisers who make inventory recommendations to the stores. How did she use her Cobol skills to improve her long-term outlook by making the transition to distributed processing?

"I didn't know it at the time, but during a six-month training class we were being watched by information systems managers to see how we reacted in class," she explains.

"They wanted to see if you really wanted to work. My manager specifically requested me for the merchandising department because I spoke out. I asked questions and challenged things."

Now that Hall has been conducting inter-

views, she says she realizes the importance of responding well to questions as well as situations.

"A while back, IS people were seen as people who were put in a closet to code applications; they didn't need a personality. That's changed."

—Leslie Goff



Danny Turner

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the by amy berrmar and kathleen rotenberg **HEAT** goes on

Best of times, worst of times

How does the stress level for your IS department compare with last year?

MORE	57.4%
SAME	34.7%
LESS	7.9%

How does your current job satisfaction compare with last year?

INCREASED	32.4%
DECREASED	25.8%
SAME	41.8%

What is the level of job satisfaction in your company's IS department?

IMPROVING	15.5%
STABLE	50.4%
DECLINING	34.1%

Are you working to your fullest potential?

YES	34%
NO	66%

The continual crash course in corporate downsizing and re-engineering has left information systems pros both empowered and exhausted.

Computerworld's Seventh Annual Job Satisfaction Survey of 781 IS managers and professionals reveals that ongoing pressure is both squashing and molding people and careers. Some thrive; others don't survive.

Many IS pros, despite staggering new work loads, continued stress and more demanding business units, insist they're satisfied with their career (see chart at left).

Even so, employees who once planned on long-term careers continue to grapple with the consequences of layoffs, cutbacks and stalled upward mobility. Overall satisfaction, although still high, is eroding.

Even more disturbing is a continued increase in the number of respondents who believed they were performing below their potential.

Because numbers don't tell the whole story, on the next pages we've profiled two survey respondents — a staff analyst and a midlevel manager — to tell the IS job satisfaction story.

Continued high pressure from corporate downsizing and demanding business units molds some, crunches others

Middle execs learn skill, gain notice

After back-to-back budget cuts and layoffs sliced almost one-third of the corporate staff at Steelcase, Inc.'s office furniture factory in Fletcher, N.C., systems manager Anne Smith was less than optimistic about her long-term career prospects.

"I felt pretty dead-ended," says Smith, 36, who has held her position for eight years.

Steelcase's Anne Smith: The closeness of her thirtysomething staff during these tough times has been personally satisfying.

Predictably, middle managers in information systems — like many of their colleagues in other disciplines — are more fearful about job loss than IS professionals and top managers.

Spending cuts have crimped development plans. Yet having the opportunity to learn new skills is important to 63% of the midlevel managers surveyed, and, according to Smith, her 12-person team is eager to move to client/server technology.

Although, she says, her staff is respected technically, senior management wonders whether the staff members are too young to handle sizable projects. Minimal raises and scarce opportunity for promotion have simply added to the pressure.

Improving morale

Then this past spring, morale began inching upward.

The economy improved, making layoffs less likely. Then a budgeting change shifted hardware purchases to end users, relieving Smith of having to reject requests for new systems. The factory also began working toward

ISO 9000 certification, which is given to manufacturers who achieve high quality.

Most noticeably, Smith's own contributions were publicly recognized when she was asked to join the vice president's strategy-setting team. This highly visible task force extends the IS reach to the entire plant and positions Smith's department as a key contributor to identifying and resolving critical business problems.

Her next step is to extend this satisfaction to her staff. Like most managers, Smith ranks job security, public recognition and enhanced work tools as factors that would help her group work more effectively.

For now, she'll strive to keep her team going with frequent informal dis-

cussions, staff training and joint tackling of the ever-present backlog of applications.

Smith says members of her staff — all in their 30s — are unusually close. This has become an unexpected source of personal satisfaction.

"I think that's what's kept us hanging in there," she says.

METHODOLOGY

For this survey, *Computerworld* polled 781 information systems managers and professionals selected from our subscriber list.

Survey took place in June and was coordinated by IDG Research Services in Framingham, Mass.



Rob Nelson

Staffers not immune to reorg blues

MIDLEVEL MANAGERS

SATISFACTION: Widely down from last year and lower than that of top bosses. Only one-fourth said they felt "very satisfied." Most blamed poor leadership and fuzzy direction.

IS PERFORMANCE: Not as good as top bosses believe but this group is more optimistic than IS professionals.

BEST MOTIVATORS: Strongest believers that personal congratulations mean a lot. More money would help, too.

STRESS: Slightly better than last year. Even so, more middle managers (57%) experienced greater stress this year (though less than IS professionals).

MOBILITY: Surprisingly the most inert group. Only 6.9% were actively looking for a new job — half the number of higher and lower levels.

SEX MALES: 81.6%
FEMALES: 18.4%

AGE UNDER 25: 1%, 25-34: 21.5%, 35-44: 40.7%, 45-54: 29.7%, 55-64: 6.8%, 65 AND OLDER: 0.3%

With ITT Hartford Life Co. facing reorganization, it's somewhat difficult for staff consultant Bryan Lifsey to look on the bright side of things.

Yet he frequently does. Lifsey relishes the day-to-day contact with other information systems professionals and the conveying of requests for new projects to an IS steering committee. He is part of a 150-member information management administration department at the Connecticut insurer.

Lifsey says he's had ample opportunity to learn new technical skills and believes he is working to his potential. This is a relatively unusual statement considering that 66% of his peers responded that they aren't working to their potential.

But after 14 years at Hartford Life and 20 years in the industry, uncertainty is taking a toll: Lifsey says he's less satisfied now than he was last year.

"Restructuring is almost as traumatic as layoffs," says Lifsey, who logs 45 hours weekly and thinks his co-workers are working longer and harder.

"I think people are performing to their fullest potential," he says. "They're putting in more hours and working harder because of the job security issue."

Uppers

More bonuses, salary increases, public recognition of accomplishments and improved opportunities for advancement could help his morale, Lifsey says, and would help his group perform more effectively.

Nearly one-third of the entire survey sample reported leadership problems

as a primary source of job dissatisfaction. The survey found IS professionals were most likely to leave their current jobs for better career opportunities (63.9%), better pay (51%), less stress (33.2%) and, yes, superiors with better communication skills (26.1%). ■

Bermar and Rotenberg write about the computer industry at Corporate, Inc. in Newton, Mass.

IS PROFESSIONALS

SATISFACTION: Poor. Only 18% said they were "very satisfied" with their job — about half the percentage of top-level managers. Most frequently cited reasons: poor management, layoffs, weak economy, few training opportunities.

STRESS: Down a bit but still edges out middle managers as the most stressed-out group. Some 58.8% experienced more pressure than in 1992, blaming staff cutbacks, concerns about job loss and anxiety about recession.

IS PERFORMANCE: Warning sign: Twice as gloomy as top bosses — almost half said IS satisfaction was declining. And only one quarter said IS performance was improving — half the number of top execs who said so.

BEST MOTIVATORS: Strongest believers that better pay and personal advancement opportunities are key.

MOBILITY: Less desire to change jobs than last year. But one in 10 said they are actively looking for a better post.

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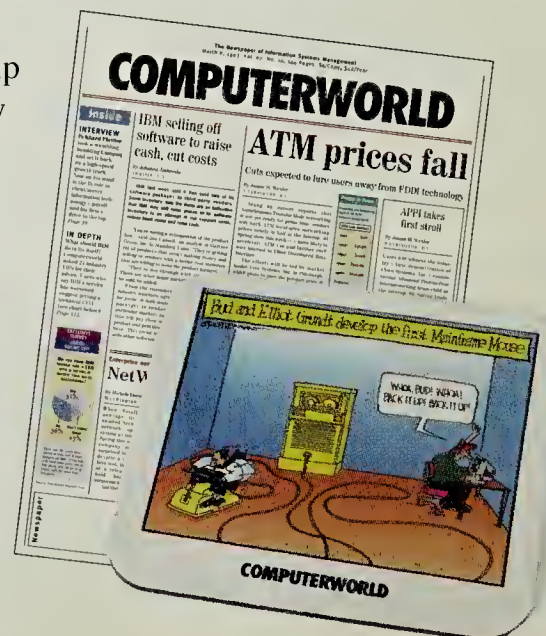
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A PLETHORA OF JOB-HUNTING RESOURCES

■ directories

Peterson's Job Opportunities for Engineering, Science and Computer Graduates. Yearly directory. Provides company basics, including information on how many graduates companies plan to hire. Provides profiles of hirees. Lists skills requirements, degrees sought, contact information.

Dun's Regional Business Directory. Contains information on the largest companies in a region.

Standard & Poor's Corporation Register. Companies in the U.S.

Dun & Bradstreet's Million Dollar Directory. Companies in the U.S.

Corporate Technology Directory. Lists information on 35,000+ U.S. firms that manufacture or develop high-tech products.

■ scholarships & fellowships

Boston Society for Information Management Fellowship. The program assists master's-level students who engage in IS-related research. Contact: Stephen Schiffman, chairman, BSIM Fellowship Committee. (617) 239-5574.

Dynetics, Inc. Endowed Scholarship. Full tuition to the University of Alabama, Huntsville, for students with academic excellence in computer engineering or computer science, among other areas. Contact: Financial Aid, University of Alabama, Huntsville. (205) 895-6241.

The National Science Foundation graduate research fellowships. For graduate research in computer science and engineering. Contact: NSF Graduate Research Fellowships. (615) 483-3344.

The Hertz Foundation fellowship. Selection criteria: 3.75/4.0 undergraduate GPA with a concentration in applications of physical science. Contact: Fannie and John Hertz Foundation. (510) 373-1642.

■ industry associations

The Computing Technology Industry Association
Lombard, Ill.
(708) 240-1818

American Society for Information Science
Silver Spring, Md.
(301) 495-0900
Student Contact:
Candy Schwartz
Simmons College
(617) 521-2849

Association for Computing Machinery
New York
(212) 869-7440
Student contact:
James Nolen
Baylor University
(817) 755-3871

Tele-Communications Association
Covina, Calif.
(818) 967-9411

■ recommended reading

The No-Nonsense Guide to Computing Careers
(Association for Computing Machinery).
(212) 869-7440. Student discount.

The Programmer's Survival Guide: Career Strategies for Computer Professionals (Yourdon Press). (201) 592-2000.

Covin's New England Computer Job Guide or Covin's Washington, D.C. Computer Job Guide. (Vandamere Press).
(703) 525-5488.

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